Telephony.

THE AMERICAN TELEPHONE JOURNAL

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The Wisconsin Classification of Accounts.

The plan for a uniform classification of accounts prescribed by the Railroad Commission of Wisconsin some months ago, and reproduced in other pages of this week's TELEPHONY, is undoubtedly the most important contribution to the knowledge of this subject which has been issued. Many of the fundamental ideas embodied in this classification, as well as the experienced gained in Wisconsin in the collection of data, and the determination of rate questions based upon books kept in the prescribed manner, will have an influence in other states when legislation for state control of telephone systems is passed, as it is sure to be.

Particular attention may be paid to the method of grading the requirements for systems of different sizes, so that the work of bookkeeping need not be unduly expensive in proportion to the magnitude of the operations of any particular system. The plan for the segregation of the accounts of each exchange system, and for toll and local plants, touches upon a phase of the business which admittedly offers great difficulties, yet the advantages which may be derived from such a separation are not less valuable to an operating company than to the rate-paying public.

The whole plan may well be considered not merely as indicative of the trend of requirements of Public Service Commissions, but of sound accounting practice such as the associations of gas and electric railway managers have done so much to promote.

Protection.

The installation of protective devices on telephone wires is as much a necessity as insurance against loss by fire. It involves an expenditure in the same class as fire insurance, and the business prudence which justifies one justifies the other. In fact, a telephone plant or subscriber's station into which lines enter without proper protection is subject to greater fire hazards than ordinary property. It is exposed not only to the ordinary fire hazard, but also to a hazard from excessive foreign currents, which may be communicated to lines by lightning and contact with commercial lighting and power circuits.

The practice of telephone companies in regard to the use of protective devices has not been uniform. There are some companies which use little or no protection, and argue that because they have been free, or practically free from damage in consequence, the hazard is negligible, or does not exist.

Every community has, unfortunately, a small number of

persons who can see no danger until calamity has arrived. In the telephone business these people argue that past freedom from fire or accident assures future immunity. That such a policy is short-sighted and unbusinesslike, the majority of persons will readily admit.

Long experience by many companies has firmly established the fact that protection is a good investment; that it saves property from damage and loss, and that it protects employes and patrons to a great degree. There have been, indeed, rare strokes of lightning against which nothing could protect, but in the majority of instances protection pays for itself.

There has been, of late, some discussion as to the proper kind and arrangement of protection. Naturally this depends in some degree upon the frequency and severity of electrical storms in various sections of the country, and upon the local prevalence of electric light and power wires of a dangerous character. But good engineering practice recognizes three distinct types of protective device: the fuse, the lightning arrester and the heat coil. Each performs a separate and important function.

The function of the fuse is to open the circuit when called upon to carry a current in excess of its capacity; the function of the lightning arrester is to establish a path from line to ground when the potential upon the line exceeds a critical value; the function of the heat coil is similar to that of the fuse, but, whereas a fuse is commercially unreliable for operation upon currents of less than one ampere, the heat coil is satisfactory with currents of only a fraction of an ampere, and serves to protect the fine wire windings of apparatus.

These three devices must be installed with the proper relation to each other, or otherwise their functions, when performed, may endanger rather than protect the property.

Fuses should always be on the line side of the arrester, so that when current at a dangerous potential enters the premises where they are installed and arcs through the arrester to ground, the resulting flow of current will blow the fuses and disconnect the line entirely, outside of the operating equipment. Fuses may operate after heat coils cut high resistance coils out of the line circuit.

Heat coils installed in the central office should be on the switchboard side of the arrester, their function being to open the office circuit when such a foreign current flows over the circuit as will overheat the apparatus, but not blow the line fuses. Obviously the reverse arrangement of fuses and arrester eliminates the fuses from the path, between the outside line and the arrester ground—the path which will be traversed by the dangerous current.

The capacity of the fuses, the voltage at which the arrester is adjusted to arc and the capacity of the heat coils, are all susceptible of variation, in the construction, to suit different requirements. We cannot discuss at this place the proper location of protection under all circumstances, but a warning should be stated in reference to the fundamental importance of a proper ground connection from the arrester. If this connection is defective, the arrester will fail to work or will do so in an efficient manner. The ground connection must be of very small resistance, and it must be of a substantial, reliable character, with ample conductivity. It should never be encased in iron pipe, or run in close proximity to iron, because by such means the inductance, and in turn the impedance, to alternating currents would be materially increased and the efficiency of the arrester diminished.

But the necessity for placing the fuses on the line side of the arrester cannot be over-emphasized. The fuses will not perform their function until the arrester has first operated, and if they are not situated between the line and the arrester, they cannot properly protect the office. This whole theory of protection is based upon the assumption that the office will not be safe until a line, over which the dangerous current is entering, has been opened at its point of entrance to the building. In order to open the circuit it is necessary to blow the fuses; in order to blow the fuses, a sufficient current must flow through them; in order that this current may flow, a low resistance path to the ground must be established. The arrester establishes the ground path and the fuses open the line, the last-named act being the one which establishes the condition of safety. Every telephone operating officer will do well to drill these facts into the minds of his assistants.

Iowa's Grievance.

A few Iowa Independent telephone men have been afflicted with the "I can't" disease, and because of their own weakness are indulging in much foolish talk. One of the erstwhile prominent persons, after giving a convincing personal demonstration of the profits which can be cleaned up in the Independent telephone business, is vociferously decrying the possibilities of making money by legitimate operation. Another of those few who have fallen by the wayside maintains his reputation as a loud talker, while studiously avoiding any mention of the personal and managerial delinquencies which led to his downfall; and now to complete the trio comes one Mr. McFarlin, who after a tearful letter resigning his directorate of the Des Moines Mutual company, gives out an interview saying that "for more than three years the Bell interests have been after the country lines, aiming from the first at the key of them, the Mutual company here. By securing control of its lines it now has the other Independent companies at its mercy and by a gradual system of 'freeze out' can back them out of business. By refusing service to the country systems it will throw the business to the Bell company and in the course of a few years the Bell monopoly in Iowa will be supreme."

Myopia is a disease sometimes known as near-sightedness, and it has been prevalent among Iowa talkers who have failed to do their work. But it need not affect the several hundred Independent systems which have made Iowa a leader in Independent telephone development for years.

Of late the quitters have been doing the talking, but this does not alter the fact that Iowa has several hundred Independent systems, with a common interest in continuing the work of development they have carried so far. To a man who is willing to stand by his job, conditions in Iowa are to-day favorable for making a record not as a talker, but a worker, and with Perry Holdoegel back as president of the Iowa Independent Telephone Association, the chair is occupied by a man who knows how to work.

The type of man who is the possessor of a wishbone instead of a backbone is not entitled to speak for the Independents of Iowa. Iowa Independents, speak for yourselves, and back up the men who work!

Telephony in the Operation of an Electric Lighting and Power System

By S. R. Edwards

From time to time various articles have appeared in the technical press about the Commonwealth Edison Company, of Chicago, Ill., describing its generating stations and distributing systems, but laying little stress upon the importance of the telephone in the operation of the entire system.

Perhaps in no other single industrial work does the telephone play so important a part as in the control of this great network of substations and transmission lines.

A brief description of the system will be of assistance in properly understanding the necessity of good telephonic communication. There are three plants, generating alternating current at 9,000 volts, 25 cycles, with a rated capacity of over 225,000 kilowatts.

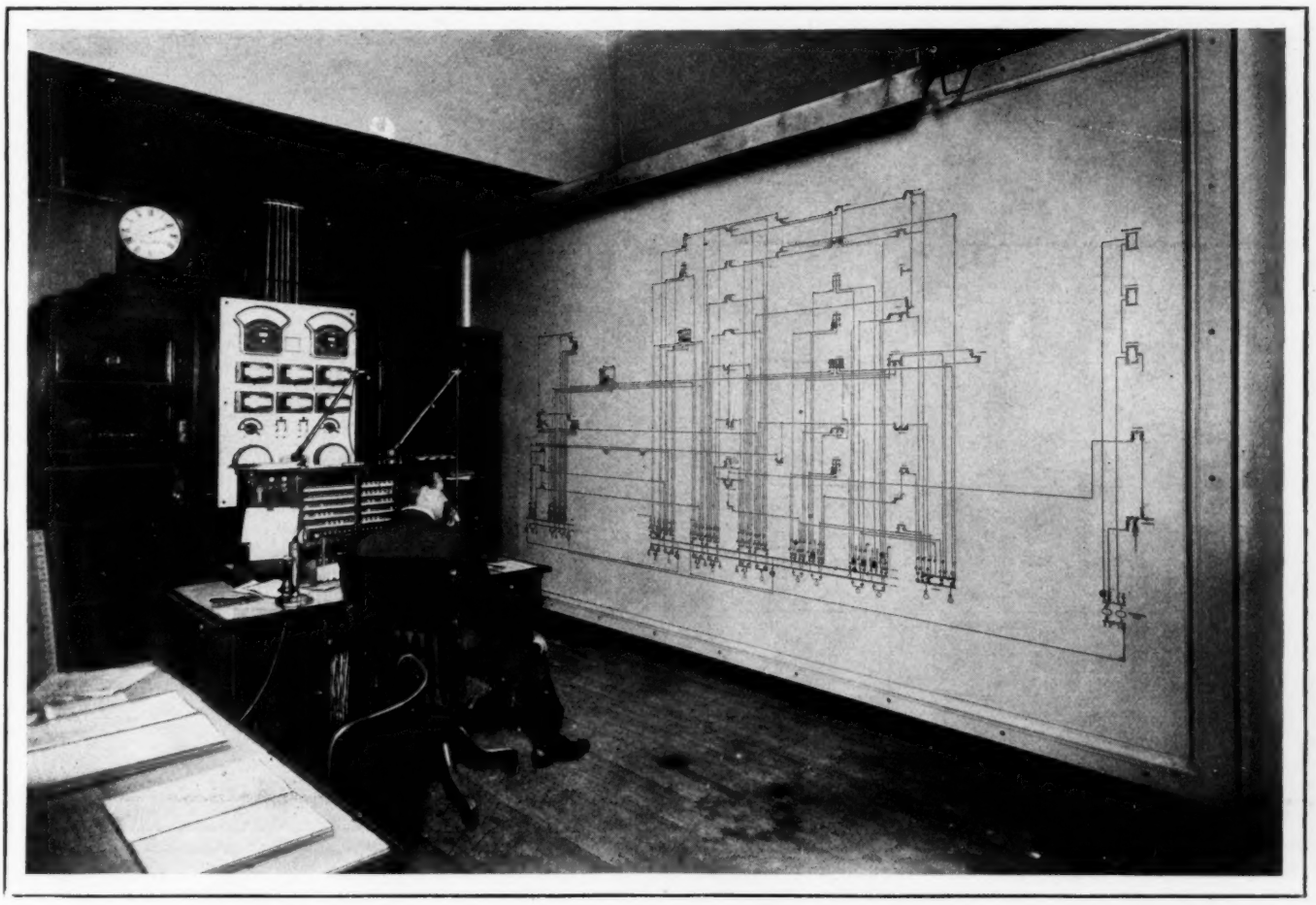
In the Fisk street station, the largest of the three, there are installed ten steam turbo-generators of a rated capacity of 12,000 kilowatts each. Across the river is the Quarry street station, which at present contains three turbo-generators of a rated capacity of 14,000 kilowatts each. Provision for enlargement has been made in both of these stations.

About 200 transmission lines connect the generating stations with the fifty substations beside which there are many tie lines between substations. In these substations the 9,000-volt alternating current is converted to 110-220-volt direct current, 2,300-4100-volt alternating current or 500-volt direct current for railway service. The territory served is approximately 27 miles long and 8 miles wide.

In order to reduce the hazard incident to having so great a capacity operating in multiple during the time of heavy load, the system is divided into three sections, which are run separately so that trouble on one section would not affect the others. It is evident that to successfully operate such an interconnected system, the control should be vested in one central office, and for this duty the position of Load Discpatcher has been created.

In the load dispatcher's office is a large one-line diagram board, showing all the stations, transmission lines, and substations. Holes are drilled in this board to indicate oil switches, and colored pegs are used to denote whether a switch is open or closed.

The control of all the high tension switching is in the hands of the load dispatcher. As soon as he gives any switching orders, and upon a report from the station operator that the instructions have been carried out, he plugs up the wall diagram in accordance with the conditions produced by the execution of the orders. He can thus tell by a glance at the board the condition of the switching throughout the system.



In the Load Dispatcher's Office of the Commonwealth Edison Electric Company. Through This Telephone Switchboard Orders are Issued Governing the Opening and Closing of All High Tension Switches.

Instruments indicating the pressure and frequency of the 25-cycle systems and the direct current in the downtown district are installed on a marble board directly in front of the telephone switchboard.

The telephone system used by the load dispatcher is entirely independent of the main private branch exchange switchboard of the company, except for one connecting trunk.

The telephone switchboard used for the load dispatcher's work is a two-position, 100-line desk type, as shown in the illustration on the preceding page.

Each position is equipped with terminal apparatus for 50 lines, which are connected in multiple on both positions. White and red lamp caps are used for covering the line lamps. The dispatcher on one position will answer all calls which are indicated by the white lamps, and the other dispatcher will take care of the calls on the lines designated by the red lamps.

The wiring of the board is so arranged that another dispatcher can be used on each position in case of emergency, as in case of trouble the calls come in very fast and two men cannot handle the work satisfactorily. When these extra dispatchers are used, the scheme for answering calls and giving orders is for one dispatcher to take charge of calls on the lower row of jacks, which connect with the generating stations, another looks after the downtown substations, a third takes the outlying substations, while the fourth takes charge of the railway substations.

The board is also equipped with a monitor circuit, so that the chief load dispatcher can listen in and keep track of each dispatcher, thus keeping in touch with the entire situation.

Each position is equipped with six pairs of cords, and hand sets are used instead of the regular suspended transmitter and head receiver. In answering a call, the calling end of the cord is used for the reason that no connection from one line to another is made on this board. There is more than one station on some of the lines, and as it is occasionally necessary to call up a station on the same line as the station to which the dispatcher has been talking, this can be done without removing the cord, thus saving some time.

The board is also equipped with hand ringing generators for use in case of an accident to the ringing power.

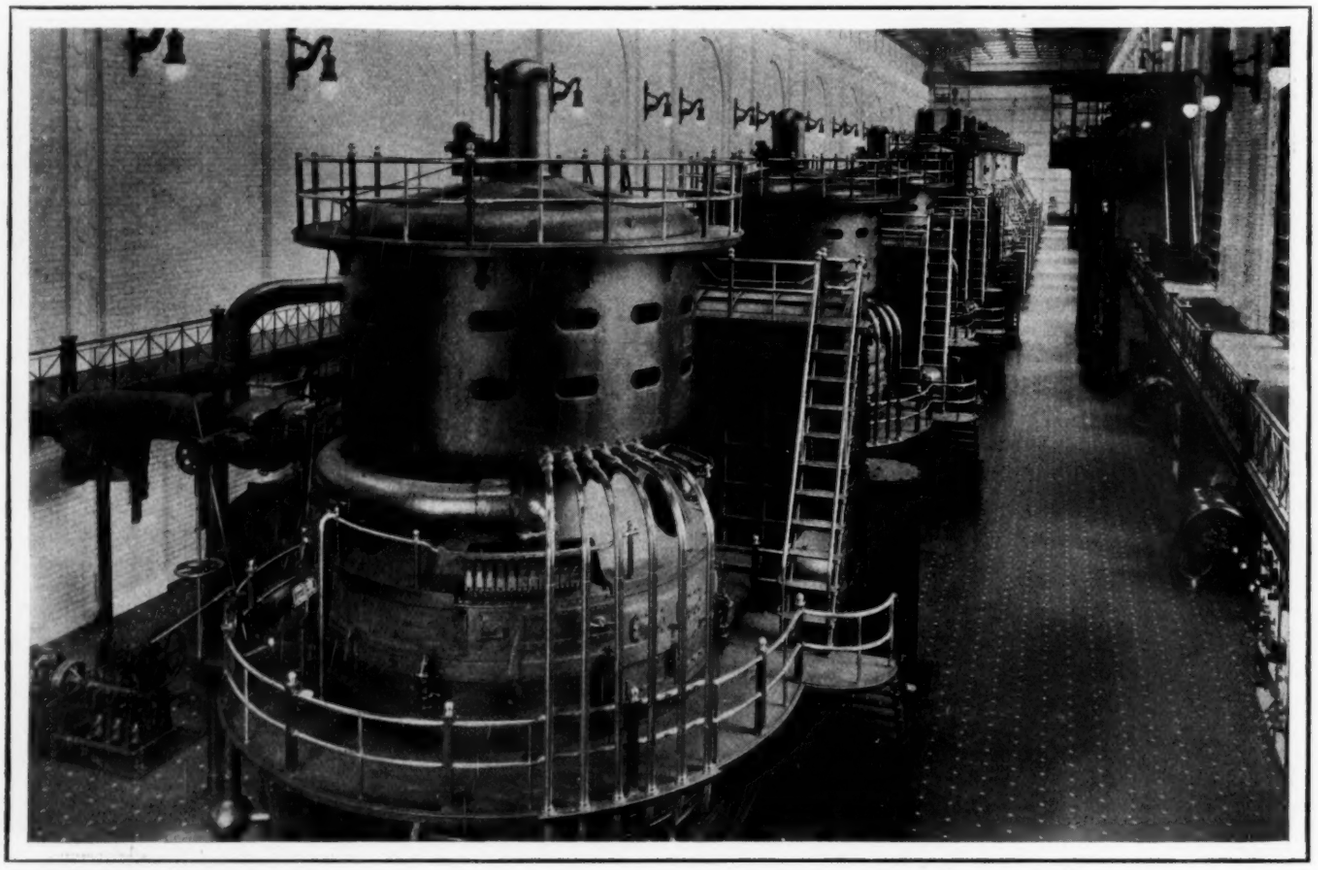
Communication may be also had with the stations over the regular lines of the telephone company.

In addition to the above duties, the load dispatchers control the work which is done on certain overhead and underground lines and in the various stations. Before any work can be started, a written permit must be obtained from the load dispatcher's office, so that the workmen will be fully protected. Work being done on any part of the transmission system is indicated by red tags on the diagram board.

Upon the desk part of the switchboard, under a plate glass, are detailed diagrams of the circuits in each station, so that the load dispatcher can readily refer to them in case he desires more information than given on the board diagram at right of the telephone switchboard.

There usually are two load dispatchers on duty, and in cases of emergency their office is locked up so that there will be no interruption to their work.

The important part which the telephone plays in the operation of this vast system can hardly be realized, as it would be much more difficult to furnish satisfactory service or operate its system without serious accidents were anything to happen to this telephone system, which so completely and in such a satisfactory manner takes care of matters relating to the operation of one of the largest electric lighting and power companies in this country.



The Fisk Street Generating Station. The Switching Necessary for the Distribution of Energy from This Immense Station is Done Entirely Under the Telephone Supervision of the Load Dispatcher.

Telephone Economy

Readers of Telephony are Invited to Take Part in the Discussion of Individual Phases of This Subject at the December Convention. Subdivisions of the General Topic are Suggested by the Following Outline

A study of economy as applied to the management of a telephone system may be pursued in many different directions. Some of them are indicated in outline in the following pages. This is not prepared as a comprehensive plan for such study, but as suggestive for the purposes of the program of the Practical Conference at the coming convention.

The keynote of the Practical Conference will be the study of economy. Volunteers from Independent companies for papers and discussion along the particular lines suggested in the outline, or along general lines of economy, are requested to write to the chairman of the program committee, Mr. G. R. Johnston of the Columbus Citizens Telephone Company, Columbus, Ohio.

If it is thought the benefit might be gained by the revival and discussion of papers presented at other conventions, suggestions to this end are requested.

All offerings need not be of extended papers. Single paragraphs that cover any valuable points can probably find a place in the proceedings. They can be handled better if written and sent in several weeks ahead of the convention, and in any event should come forward as soon as prepared. The writer should retain copies and bring them with him if he attends the convention.

The time for the preparation of papers and their consideration before the convention is unfortunately short. Those desiring to take part should be prompt at the convention. Contributions from persons unable to be present will be welcomed.

THE STUDY OF TELEPHONE ECONOMY.

It seems likely that more care in devising and applying improvements and economy to telephone construction and operation will become necessary, especially if new sources of revenue are not found, or larger savings developed by invention. As the size of a telephone plant increases, the revenue per line tends to diminish, and the cost per line to increase. As the field becomes more nearly covered, the competition becomes keener. As less prosperous subscribers are taken, collections become more difficult, and cancellations and moves more frequent. There seems to be a general tendency for wages and prices to advance. A large part of the material used by telephone companies is not far removed from its raw state. This applies to poles, copper, iron, lead, and rubber. As the natural resources diminish, prices advance. Some of these materials are affected by the tariff. The wages of workers will tend upward so long as the cost of living increases.

Educational.—Increase in efficiency and reduction in expenses may be expected to follow from increased knowledge and skill of officers and employes. In this line should be considered:

Better exchange of information between operating companies.

Better systems of accounting and classification and comparison of costs.

Improved training of subordinates.

Telephone journals.

District meetings and state and national conventions offer opportunities for exchange of information which have not been fully utilized.

On given plants possibly interest and efficiency can be improved by systems of staff meetings, wherein the different heads of departments are encouraged to consider all phases of the business.

Schools of training are sometimes conducted by the companies through evening meetings. In some cities, the Young Men's Christian Association is conducting educational classes which include electricity and telephony. Correspondence schools have such courses. Some companies encourage the entrance of their men in such classes by paying a portion of the tuition, or adding to the facilities and instruction.

Circulation of technical books and magazines supplemented by marking or cutting out special articles may help.

Savings in time and improvements in efficiency might be effected by the careful formulation and enforcement of codes of rules for all departments.

Reports and Blanks.—Generally with Independent companies there is an under-use rather than an over-use of reports; reliance being placed upon personal supervision. Reports, however, are needed to supplement this. There is a field for economy in many plants in better compilation of more reports and their study by officers.

Combinations.—By some it is considered that the best unit for telephone organization is the system covering that geographical region which has a prevailing common business interest. An example is an important city with a surrounding territory having small cities, towns, and villages whose wholesale purchases are made from the larger city, whose people go into that city for such retail purchases, such entertainment, and such social connections as may not be had in their home town. If this field is represented by a circle with a fifty-mile radius, the smaller and outlying districts can get the benefit in their telephone service of a more skilled general supervision of their business affairs and engineering needs, a saving in purchases, the adaptability of the larger organization, and other advantages, without losing the home interest and personal acquaintance.

Standards.—Economy of standardization of material and methods of frequent recurrence is well understood. The other side is, that standardization tends to restrict invention and improvements, and to fail to conform in the best manner with certain special needs. Standardization of certain items of telephone equipment might be profitably undertaken. Suggestions as to such are desirable items.

Service.—Qualities of good telephone service are promptness, ease and certainty of calling, clearness of transmission, and freedom from interruption. The accessibility of the subscribers and the general public to instruments for calling and receiving calls also influences the general service.

The maintenance of good service saves the telephone company costs in procuring subscriptions, in the number of tests and visits by troublemen, in time spent in listening to complaints, in ease and certainty of collection, and in reduction in the number of removals. It also gives the company a better standing in all its relations to the community, affecting the sale of securities, procurement of rights-of-way, relief from burdensome requirements, etc.

Construction and Maintenance Economies; General.—The ideal expenditure for construction is for that quality of material and workmanship which is just strong, durable, and efficient enough for requirements.

The requirements of practice are more variable than are the usual construction specifications. Some engineers habitually err on the side of extra good quality, and others on the side of poor quality. They are both fallacies, that the cheapest at first is the cheapest in the end, and that the best is always the cheapest. Half a century after the Pennsylvania Railroad

began business an officer managed to save some very large sums by the application of the simple rule that there is no need to maintain branches up to the standards of the main line. Some pertinent remarks about this subject appear in the paper presented at the 1908 convention by Mr. Roy Owens. It was published in TELEPHONY of July 17, 1909. One important element of economy is discrimination.

The purposes of construction and maintenance expenditures follow in about this order:

To provide service.

To improve its efficiency.

To protect and preserve the property.

To reduce future construction and maintenance.

To improve appearance.

Need for expenditures in maintaining plants grows out of the following:

Wear from use.

Decay or other deterioration from exposure or the passage of time.

Obsolescence.

Changes in service demands.

Changes required by law.

Imperfections in material or workmanship.

Damage.

Where changes can be foreseen, it may be needless to provide special protection against wear and decay. Protection against imperfection in material may be had by care in buying and provisions for testing samples of the material when it is received.

Damage and Injuries.—Telephone companies do not find their employes and property nearly so subject to injury and damage as do many other lines of industry; nor do they subject the public to much risk of injury or damage. Such losses as they have may be reduced by diligence, or in part covered by insurance.

The subject of insurance has received special consideration by Mr. J. B. Hoge. As against the fire risks, the insurance companies are always ready to give advice from their experience.

As against the losses resulting from accidents to employes, some protection may be had from careful instruction to employes.

Damage to the public from line construction and otherwise was treated before the 1909 convention by Mr. W. S. Hart, whose paper was published in TELEPHONY of September 4 and 11, 1909.

Cable.—Cable is the most expensive single item in telephone construction. Specifications embody the following:

Number of pairs.

Gage.

Wrapping.

Sheath metal and thickness.

Capacity.

Length.

Engineers are not fully agreed on the best and most economical practices in relation to these items. Engineers of training and experience, however, have well-defined views, and their purchases specify according to the conditions. Others, particularly on small plants, need special guidance to purchase and construct to the best economy.

It is suggested that a series of empirical tables might be drafted by competent engineers, which could be applied by those of less training or experience to their own particular needs.

A series of cost tables showing comparative average costs of different sizes of cables in place, cost of open wire construction, costs of putting up and taking down cable, etc., would be valuable. So would instructious as to modes of changing cable and taking down and rehanging. Some valuable data regarding cable was presented in a paper by Mr. Thomas G. Spencer of Rochester, which was published in TELEPHONY of February 20, 1909.

Cable distribution comprehends too many considerations for convention treatment; but some of the greatest opportunities for economy are in this work, and brief suggestions are desirable.

Poles.—Savings in pole construction can be effected by reduction in size, use of cheaper wood, spacing poles farther apart, exchange of pole privileges with other companies, and the furnishing of their own poles by rural subscribers.

The original tendency in pole line construction was to use poles of unnecessary length. To reduce depreciation there are various preservatives and various modes of their application. Some experiments have been made with concrete poles. Practice in guying to maintain the strength of pole lines does not appear to be settled.

Crossarms.—Crossarm saving can sometimes be effected by studying the probable demand and supplying no more pin space than will be needed.

Long-lived pins in short-lived arms are wasteful.

Line Wire.—A greater saving in first cost comes from buying iron instead of copper. This is not always economy in the long run. The economy of copper-covered steel wire seems not to be fully determined. A careful balance of the respective merits of copper and iron wire, taking into account the lengths, sizes, transmission requirements, exposures, re-use or junk values, and fluctuating prices, put into empirical tables about as suggested for cable, would be valuable to many companies. Companies serving congested districts find economy in locating cable terminals at frequent intervals so as to reduce the amount of line wire required to reach subscribers. Just where to place terminals is often a matter of nice judgment.

Drop Wire.—Various claims are made for the relative economy of running from the pole to the house in two-base wires, one base and one covered wire, two covered wires separated, and two covered wires twisted into one line.

Tree Trimming.—Good service requires lines to be free from trees. Trees may be avoided by constructing lines around or over them, or destroying the trees. Their effect upon the circuits may be prevented by the use of cable or of insulated wires. Better, the limbs may be cut away from the wires.

Rights to destroy or trim trees may sometimes only be had for money. Payments may be reduced by a reputation for care in trimming and conformity to the owner's ideas. In the original consideration for right-of-way, the inclusion of tree-rights will usually cost less than later separate considerations. Knowledge by the trimmers of the character of different trees may be a great help. Men cutting upon permission to thin out a fence row of the height of eight or ten feet have been known to cut the elders and leave the poplars.

Ordinary tree wire is a makeshift.

It is a fallacy to suppose that cable can be run with impunity through trees. The sheath needs protection against limbs.

Subway.—All subway is conceived to be permanent. Economy lies in good durable construction methods. Good judgment is required to avoid either too many or too few ducts. At times, their construction may be combined with other companies. There is economy in drainage of manholes, and care to protect the cable from electrolysis. The amount of concrete used may be varied according to the character of the ground.

Interior Wiring.—The general opinion is that cheap qualities of interior wire are not economical. Opportunities for saving in length by inducing the subscriber to locate the telephone in a more economical position are rare. The best opportunities seem to be in labor, by instructing the men in the economical use of material, and by such provision as keeps them working to the best advantage.

Special attention might be given to second uses of material.

Telephones.—Repairs to telephones are relatively expensive

because of their being scattered. If instruments of good make are chosen, the repairs are lessened. Putting all instruments through the shop on every change is economical. Damage from carelessness of subscribers may be reduced by care in placing encouraging use of wall telephones or desk brackets, discouraging extra-length cords, enforcing a penalty for extra carelessness.

The changing of local batteries on magneto systems is an item of expense that can be reduced by attention.

Changes, Moves, and Cancellations.—Saving in cost of changes is best effected by charging for them. This operates both to reduce the number of changes and to provide a credit against those which are ordered.

The number of cancellations is reduced by good service, and, at times, by inducing the subscriber to reconsider his order for cancellation.

The cost of moves may be reduced by attempts to have the telephone in its original location taken over by the new subscriber.

Switchboards and Central Office Equipment.—These vary so much in kind and detail that no general considerations are offered here. A study of special cases, or of methods of use of men and material having general application, would be of interest.

Shops, Stables, and Warerooms.—The conduct of these to save money is largely a matter of system and care. Descriptions of systems and their benefits are desirable.

Operators.—The possible saving opportunities are: Reduced wages, reduced traffic requirements, increased efficiency, better facilities.

The tendency of wages seems to be upward. The tendency of the public seems to require more in the way of calls and requests for information.

Some reductions in certain excessive traffic requirements may be established by expansion of pay-station service.

An increase in the working skill of the best operators is hardly to be expected, but there is a possibility of procuring more of the operators skilled in manipulation and in diplomacy, who will be able to increase traffic handled over toll lines and thus increase the revenue or reduce the number of operators required. To this end some considerations have been given to the possible economy of a higher level of flat wages, or the establishment of a system of bonus payment for messages handled in excess of the assumed normal day's work.

For both local and long-distance traffic, but principally the former, the outlook seems to be for continued improvement in the equipment whereby the work required of, and time consumed by, switchboard operators is reduced.

Stationery and Office Expenses.—Attention is usually given to economy in the purchase of office supplies. There is frequent opportunity to save in the office labor by a study of improved methods, and the adoption of improved machinery. A principle not thoroughly established in all offices is: Do nothing more than once if one doing can be made to answer. The economy of labor and machinery is to keep both busy; hence machines and methods which may be economical for large offices are not so for small.

The tendency of clerks is to fall into ruts. Care may be taken to make these ruts the shortest and most easily traversed to reach the desired end.

Collections.—Economy in collections comes from promptness and certainty in getting the money The discount system automatically makes for promptness and cheapness. Certainty is only to be had by care in giving credits. Use of credit agencies and the interchange of information between competing companies, and a reputation for following up delinquent debtors, tend to reduce losses. Conditions do not ordinarily permit an advance charge to cover the cost of installation, but the practice of charging at least a quarter's rent before installation, and more in particularly doubtful cases, is not for most telephone companies an impossible standard.

Directories.—Directory cost may be reduced by cheapening the quality of paper, size of type, and other printer's items; putting out fewer issues, and by procuring advertising. There are opportunities to save in composition by using the same type for more than one issue, and by issuing supplements to regular books.

An Important Telephone Rate Case Ready for Adjudication.

The Home Telephone Company of Ft. Wayne, Indiana, has definitely decided to bring a test case in the courts to establish what constitutes a residence telephone as distinguished from an office telephone. It is the contention of the company that telephones located in residences and paid for at the residence rate of $2, but which are used as office telephones by the patrons whose offices and residences join each other, or are in the same building, should be paid for at the rate of $3 a month.

Secretary W. L. Moellering said "there is no intention to boost the rates, but in Ft. Wayne and other cities there are fifty to one hundred patrons who are using their telephones in their offices as business telephones and are paying residence rates. This is not fair to those patrons in the same business who pay the office telephone rate, and it is not fair to the company furnishing the service."

The test case is against Dr. Louis J. Bruner and is a friendly suit calculated to settle the contention not only in Ft. Wayne but throughout the state, since it is the understanding that the decision will be reviewed by the Supreme court. Good attorneys will be employed on both sides, and as proof of intentions to have the matter settled effectively, the telephone company has agreed to pay the entire cost of the test case.

North Idaho Company Winning Another Victory.

One of the most active companies in the Mountain territory is the North Idaho Telephone Company, which operates in the Coeur D'Alene. Starting to operate in towns of moderate size, where the Bell company had only a few subscribers, the development was rapid under Independent management. Today the company has nearly 200 telephones in Wardner and Kellogg, while its competitor has about 50; in Wallace and the Burke Canyon, where the Bell company has about 300 subscribers the Independents have about twice as many. Murray was connected with a toll station only until the Independents came, and found it easy to put in 28 telephones. Today the campaign of extension is going on in Mullan, where the North Idaho company found a monopoly plant already operating with 98 subscribers. Manager G. R. Boomer started in to show the people of the place how a live telephone company does business, and in a short time, in spite of a campaign of opposition of the usual type carried on by the other side, he succeeded in connecting, at the time we received the last report, 127 telephones, while his rival had increased its list to 106.

Prizes for Good Work Reduce Complaints.

The Home Telephone Company of Michigan awards a number of cash prizes each month to the operators employed in its various exchanges for punctuality, service and deportment. The scheme works with good success, as shown by the small number of complaints.

Jamestown Council Votes to Raise Independent Rates.

On October 11 the Common Council of Jamestown, N. Y., passed, by a vote of 7 to 4, an ordinance permitting an increase in rates for the Home Telephone Company. At the time of going to press the action or intention of the Mayor on the ordinance was not known.

An Inductive Cable Tester

By A. F. Adams

Engineer, Home Telephone Co., Joplin, Mo.

All telephone companies are getting up more or less cable in towns, and many are striving to have "all-cable" plants. This tendency in construction reduces the amount of maintenance work, but when a large cable gets in trouble, due perhaps to crystallization, a small company is often compelled to send some distance to get a man who can repair the trouble. During all of this time subscribers are out of service.

Wheatstone bridge measurements and locations are more or less approximate, due to the twist of the wire in the cable. When taking measurements the person making the measurement does not know whether he has an outside or inside layer, consequently sixty feet along the ground might be very little over sixty feet if the pair were in the center of the cable, but if the pair were on the outside of a 400-pair cable there would be considerably over sixty feet of length in the pair. On several thousand feet of cable this introduces a large variation in locations.

These conditions have led to a demand for a simple method of detecting the location of cable faults, which seems to be filled to a considerable extent by the inductive cable testing devices which are now in use in many places. After working for several months on this general proposition, the writer has summarized his conclusions as to the best method of doing this work in the small exchange, in a set of specifications and drawings hereafter reproduced. The Home Telephone Company of Joplin has been carrying on cable maintenance work according to these specifications for several months, with most satisfactory results, and they are placed at the disposal of other companies in the hope that they will be of use in reducing the expense of taking care of this class of trouble.

This specification and accompanying drawings cover a method of locating cable trouble with ease and rapidity. It can be used by any cableman or troubleman, and does not require any considerable technical knowledge.

The apparatus consists of one 75-ohm standard pony telegraph relay, with batteries and condenser for locating high resistance troubles and those due to a cable wire being crossed with its mate, and also a 5-ohm relay, with buzzer and batteries, for locating low resistance troubles except those due to a wire crossed with its mate.

The 75-ohm relay should be wired to correspond with

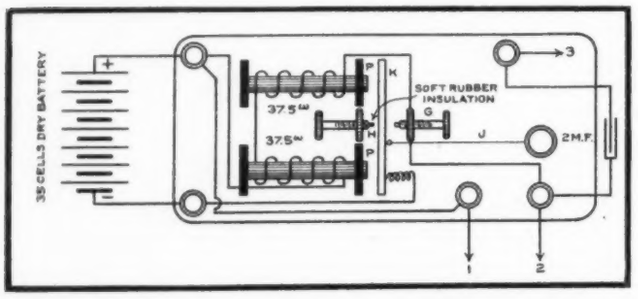


Fig. 1—Wiring of 75-Ohm Relay to Furnish Tone for Cable Testing.

Fig. 1. It must have platinum contact points and the hard rubber backing must be taken out of the adjusting pin *H* and replaced with a piece of soft rubber, such as is used for shoe heels, cut to the proper shape. The metal tension spring on the relay should be removed and replaced with a heavy piece of rubber band, doubled several times to give a strong pull.

The five-ohm relay should be wired to correspond with Fig. 2. The contact points of the relay must be of pure platinum. The buzzer should be an ordinary low resistance buzzer.

The receivers for testing should be connected as shown

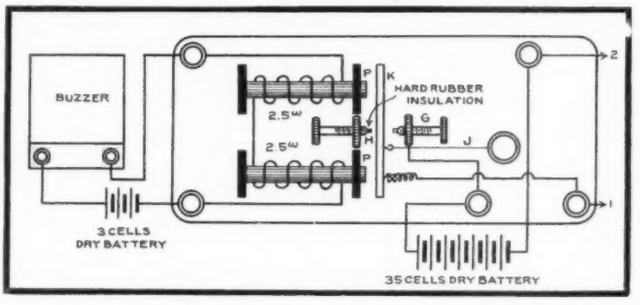


Fig. 2—Wiring of 5-Ohm Relay and Buzzer to furnish Testing Tone.

in Fig. 3. The receiver *S* has the two magnet coils connected in multiple. The old style Stromberg-Carlson 6-*B* receiver is wired correctly for this test. Receivers *R R* can be of any high grade, sensitive type.

To test high resistance troubles, connect batteries as shown in Fig. 1, and adjust the relay very closely, so that the frequency of its vibration will be extremely high. When adjusted to give a high enough frequency the relay will produce a whistling noise in the air. As a rule, the relay can be adjusted best without the rubber tension *J*, as the soft rubber insulation at the end of the adjusting pin *H* will kick the armature back to the rear contact, and a higher frequency is obtainable than when the rubber tension is used. The armature *K* should be about 1/64 in. from the pole pieces *P* when the armature contacts rest upon the rubber in pin *H*, and at the same time the contact of pin *G* should touch the armature. The battery then draws the armature to the pole piece, compressing the rubber on the end of pin *H*. As soon as the contact of pin *G* is broken, the rubber expands, forcing the armature into contact with pin *G* again. This action usually gives a much higher frequency than can be obtained with a tension at the back of the armature. If necessary, to get the relay to vibrating at the proper frequency, try adjusting the rubber tension *J*, using it in connection with the method described above.

Reference to Fig. 1 will show that where binding posts 1 and 2 are connected to the external circuit, battery impulses flow through the circuit being tested and the relay winding in parallel. Hence, if the resistance of the circuit being tested is below the resistance of the 75-ohm relay the relay will not always operate up to the proper frequency, and the condenser is then cut into the circuit by connecting one wire from the cable to binding post 3 instead of 2. This lowers the tone somewhat, and it is better to use the circuit without the condenser as long as the relay will operate at a high frequency.

To test the operating condition of the instrument, connect the relay to the circuit as shown in sketch *C*, *D* or *E*, Fig. 4, as the case may require, and then pass the *S* receiver over one of the lead wires running from the relay to the cable, at the same time leaving one *R* receiver at

each ear. If everything is working all right a humming noise will be heard in the *R R* receivers. The *S* receiver must have the cap and diaphragm taken off and the receiver coils held on a line parallel with the wire, as the noise in receivers *R R* is very slight when *S* receiver coils are held so that a line connecting the centers of their external forces is perpendicular to the wire being tested. If the noise from

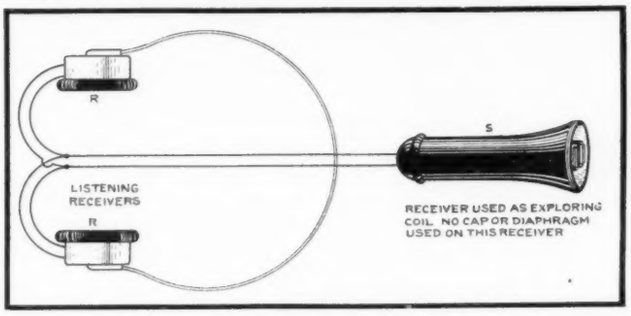


Fig. 3—Connection of Listening and Exploring Receivers. Ordinary Hand Receivers are More Sensitive than Listening Receivers of the Head Type, and may be Used if Desired.

the lead wire is not clear and strong, add batteries until it is. Then proceed to locate the trouble by listening with the *R R* receivers while passing the *S* receiver along the cable, the ends of the magnets touching the cable and the receiver being so held that the cable is parallel with a line connecting the two spool heads of the receiver as described.

Test the cable at each pole, and at each place, when testing, pass the receiver all around the cable as shown in Fig. 5, always keeping the spool heads in line with the run of the cable, as with a large cable it is impossible to hear the noise with the receiver on one side of the cable when it may be very distinct on the other side.

When testing circuits shown in Fig. 4, *D* or *E*, no noise will be heard in the listening receivers *R R* when the fault is passed.

Cable sheaths are always bonded, and are also accidentally grounded at many points. On account of this, when testing for grounds, as shown in Fig. 4, *C*, observe the following:

Between the point where the set is attached and the trouble, the noise in the listening receiver will be loud, and noise will be heard in the exploring receiver *S* when it is held with the spool heads in a line across the cable, as well as when parallel to the cable. When past the fault, there will be noise when the spool heads of receiver *S* are held firmly on a line parallel with the cable, but no noise will be heard when the spool heads are held on a line perpendicular to the cable. After the noisy side of the cable is found by moving the receiver around while held in the most sensitive position, the noise can still be heard on the test set side of the trouble if the receiver spool coils are held perpendicular to the cable; but beyond the trouble the noise heard with the receiver spools running parallel is usually fainter, and no noise at all can be heard with the receiver spools held so as to be, so to speak, astride the cable.

The test described in the preceding paragraph can be made only with a receiver in which the coils are in multiple, such as the Stromberg-Carlson 6-B. All the other tests can be made with an ordinary receiver in which the coils are connected in series.

To locate low resistance troubles, such as "solid" grounds, one wire crossed with a wire of another pair, and, in fact, practically all low resistance troubles except a wire crossed with its mate, the 5-ohm relay and buzzer shown in Fig 2 is used. Binding posts 1 and 2 are connected as shown in Fig. 4, *C* and *D*. The buzzer should be adjusted to a medium speed, as should also the relay, by manipulating the metal tension spring, *J*. Receiver *S* can be held over the lead wires connected to the wires in trouble, and adjustment continued until the loudest noise is obtained. Then one may proceed to test the same as with the 75-ohm relay. As a rule the 5-ohm relay is best for all low resistance troubles except where a wire is crossed with its mate. The 5-ohm relay will locate a cross between a wire and its mate if attached close to the trouble, but if the trouble is any considerable distance away it is better to use the 75-ohm relay.

In practical locations of cable trouble the set is connected as in Fig. 4, *C*, *D* or *E*, as the case may require, and after the leads have been tested to demonstrate that current is flowing, a man goes out of the office with the receivers to test the cable. He keeps making a test every few hundred feet until past the trouble, when no noise will be heard in the receiver. Then he gets the trouble down to one span, and rides the messenger in a cable car. The noise will stop at the exact spot where the fault lies. On actual tests on many cases of trouble, some in cable 20,000 ft. long, shorts, grounds and crosses have been located quickly and accurately. The cableman has invariably cut into the trouble by opening the sheath over a length not exceeding four ins.

Slight water grounds or "shorts" are not always to be found with any cable testing sets of this style, but ordinary wet cable can be located by using 35 to 100 cells of battery in connection with the 75-ohm relay. In all cases testing sets need to be connected as closely to the trouble as possible. Where the high frequency tone is used with the 75-ohm relay it will sometimes induce in other wires enough current to carry tone to the end of the cable being tested, if the distance between the point of attachment and the fault is too great.

The 75-ohm relay causes more trouble in this respect than the 5-ohm relay. A little practice is necessary to get the best results. If a bridge test can be made time is saved by attaching the relay to the multiple box or can nearest the bridge location, and thus repairing the trouble without cutting the cable except at the exact spot where the fault lies. When the relay is in operation it must always be set on a rigid support.

The vibrator must always be adjusted before connection is made to the circuit under test. If the vibrator in the 75-ohm relay stops when a circuit is connected the reason may be that the circuit is of too low resistance, and a readjustment of the vibrator will have to be made, or the condenser inserted; or perhaps the 5-ohm relay used instead. After the circuit is connected, if any vibration in the vibrator is noticed, it should be readjusted.

When connecting the apparatus, as shown in Fig. 4, *E*,

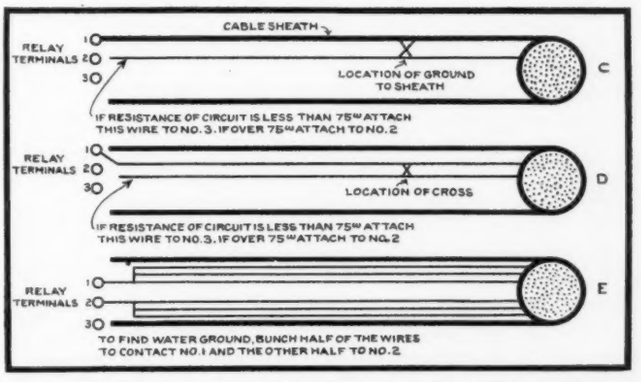

CABLE SHEATH
RELAY TERMINALS
1
2
3
LOCATION OF GROUND TO SHEATH
C
IF RESISTANCE OF CIRCUIT IS LESS THAN 75Ω ATTACH THIS WIRE TO NO. 3. IF OVER 75Ω ATTACH TO NO. 2
RELAY TERMINALS
LOCATION OF CROSS
D
IF RESISTANCE OF CIRCUIT IS LESS THAN 75Ω ATTACH THIS WIRE TO NO. 3. IF OVER 75Ω ATTACH TO NO. 2
RELAY TERMINALS
E
TO FIND WATER GROUND, BUNCH HALF OF THE WIRES TO CONTACT NO. 1 AND THE OTHER HALF TO NO. 2

Fig. 4—Method of Connecting Cable Wires in Testing for a Ground, Cross or Wet Spot.

half of the pairs are bunched on one side and half on the other. Pairs must not be split.

Good results are sometimes obtained by using only one receiver, *R*, instead of both. The person testing should use whichever gives him the best tone. When using only one

receiver *R* a dummy receiver should be held to the other ear, to shut out street noise, etc.

In Fig. 2 thirty-five batteries are shown. On very low resistances, less battery should be issued. To avoid damaging vibrator contacts in testing low restistance troubles,

Fig. 5—In Exploring for the Exact Location of Trouble, the Receiver is Passed Around the Sheath, as it Moves Forward, Progressively Taking Positions Indicated in the Sketch.

the number may be reduced as low as fifteen. The buzzer shown in Fig 2 should be an ordinary small, low resistance buzzer. A buzzer with high resistance coils will not work satisfactorily.

The apparatus shown in Figs. 1 and 2 is mounted on a piece of 1½-in. well seasoned oak board, which in turn is set on a piece of slate. When in use it must be kept nearly level, on a rigid support. If sitting on a loose support the 75-ohm relay will not maintain its vibration at a high frequency.

The 5-ohm relay should never be run at high speed, but kept on a slow or medium rate of vibration.

The only troubles which allow the tone producing current to extend past a fault are wet cable and grounds to sheath. These can usually be detected with the receiver having windings in parallel, as described above. In difficult cases good results are obtained by testing from the distant end toward the office, as the tone is usually carried past the fault by inductive transmission to working lines which are grounded beyond the cable box.

Considerable practice can be obtained by taking a piece of old cable, 30 to 50 ft. long, and laying it out to represent a working section. Then, a few feet away, stretch a single wire representing the ground, and bond the cable to the ground wire at each end. Cut open the cable in the middle, and set up the various circuits described herein. If a small piece of cable cannot be obtained, use a piece of twisted pair wire, and test by short circuiting and grounding. In testing these short lengths with the 75-ohm relay always have the condenser in circuit by using posts 1 and 3, Fig. 1, or else introduce artificial non-inductive resistance in the lead wires.

Success in using this set depends on adjusting the vibrator of the 75-ohm relay to such a high frequency that it whistles, and adjusting the 5-ohm relay to a regular medium speed, and following carefully the instructions here given, including the circuits shown in the diagrams.

Telephone Girls Save Perry, Ohio, From Flames.

On the night of Sept. 27 at Perry, Ohio, fire broke out in a store under the telephone exchange in which two night operators, Hazel Christian and Alice Warren, were sleeping.

The girls stuck to their posts and telephoned to the sleeping citizens. They had trouble in getting answers, and called the Painesville and Madison fire departments for help. While they were talking with the Painesville fire chief the flames reached the wires and the girls in their night clothes stumbled down the stairs through the smoke to the street.

Two stores, a livery stable and a dwelling were burned before aid from other towns arrived, and the conflagration would have been much more disastrous but for the bravery of the operators.

Uniform Classification of Accounts for Telephone Utilities

Prescribed by the Railroad Commission of Wisconsin

"This circular embraces the uniform classification of accounts for telephone utilities prepared under the following provisions of Chapter 499 of the Laws of 1907, known as the Public Utilities Law:

"*Uniform Accounting by Utilities; Other Business Separate.* Section 1797m—8. 1. Every public utility shall keep and render to the commission in the manner and form prescribed by the commission uniform accounts of all business transacted.

"*Forms of Bookkeeping; Prescription. Section* 1797m—9. The commission shall prescribe the forms of all books, accounts, papers and records required to be kept, and every public utility is required to keep and render its books, accounts, papers and records accurately and faithfully in the manner and form prescribed by the commission and to comply with all directions of the commission relating to such books, accounts, papers and records.

"*Report by Utilities; Items.* Section 1797m—18. Each public utility shall furnish to the commission in such form and at such times as the commission shall require, such accounts, reports and information as shall show in itemized detail: (1) the depreciation per unit, (2) the salaries and wages separately per unit, (3) legal expenses per unit, (4) taxes and rentals separately per unit, (5) the quantity and value of material used per unit, (6) the receipts from residuals, by-products, services or other sales separately per unit, (7) the total and net cost per unit, (8) the gross and net profit per unit, (9) the dividends and interest per unit, (10) surplus or reserve per unit, (11) the prices per unit paid by consumers; and in addition such other items, whether of a nature similar to those hereinbefore enumerated or otherwise, as the commission may prescribe in order to show completely and in detail the entire operation of the public utility in furnishing the unit of its product or service to the public.

"From time to time circulars have been issued explaining the general principles upon which the accounts to be kept were to be based, with the result that a considerable number of utilities have for some time had in operation a system which conforms substantially to that herewith submitted. It will be noticed by those utilities that the principal differences between this classification and that which they are now using are in the subdivisions of the classification or the grouping of the accounts, and in the titles of certain accounts. The work in its present form is the result of an examination of accounting systems of practically all telephone properties in the state, supplemented by investiga-

tions of accounting systems used by utilities foreign to Wisconsin. Frequent conferences with telephone company officials have been held. It is desired that those telephone utilities which have not conformed their accounts to this system will do so at their earliest convenience. Some substantial departures from the subdivisions often employed in classifications followed in the past will be noted. It is possible that, after an adequate trial, some alterations will be found expedient both from the standpoint of general experience and practice or because of local and individual conditions. For the present, however, this classification is prescribed, and upon it will be based the annual report to be made to the Railroad Commission. In the near future a detailed text of instructions to accompany this classification will be mailed to each telephone utility.

"It is required that every telephone utility open a separate set of revenue, operating expense and construction and equipment accounts for each operating system comprising its property. By operating system is meant an exchange system, or toll system composed of one or more toll or long distance telephone lines. An exchange system is intended to include the entire territory within which telephone service is furnished under contracts for exchange service, without restriction as to toll or message charges for service between different parts of such territory. An exchange system may contain more than one central office, provided no additional charge beyond the regular charge for exchange service is made to subscribers at one central office for connections with subscribers at another central office.

"The accounts contained in this classification fall under two headings, as follows: (1) Accounts for each operating system; (2) Accounts for the utility as a whole. The accounts for the utility as a whole are designed for all telephone utilities regardless of size. Because of the great difference in size of the operating systems, both exchange and toll, which comprise the properties of the telephone utilities, it was found necessary to prepare four separate schedules of accounts for operating systems, which would recognize these conditions, and by each following the same general principles, would permit comparison of operating systems. Class 'C' schedule is the basis upon which class 'B' and class 'A' schedules have been founded, the latter two being unfoldings and refinements of the first. Class 'D' schedule is a modification of class 'C' schedule, designed to meet the requirements of the smallest operating systems.

"In general, exchange systems operating in cities of substantially 15,000 population or over, will keep at least the list of accounts prescribed in class 'A' schedule of accounts for each operating system; exchange systems operating in cities of over 5,000 population and less than 15,000 population will keep at least the list of accounts prescribed in class 'B' schedule, and all other exchange systems will keep at least the list of accounts prescribed in the class 'C' schedule, except exchange systems operating not to exceed 150 telephones, or thereabouts, which may keep the list of accounts prescribed in the class 'D' schedule. Toll systems, whose total operating revenues are substantially $20,000 per year or more, will keep at least the list of accounts prescribed in the class 'A' schedule; toll systems, whose total operating revenues are over $5,000 per year, but less than $20,000 per year, will keep at least the list of accounts prescribed in the class 'B' schedule; and all other toll systems will keep at least the list of accounts prescribed in the class 'C' schedule, except such as have merely nominal gross operating revenues, which may keep the list of accounts prescribed in the class 'D' schedule. Farm line, rural, mutual and co-operative telephone utilities, which operate not to exceed 150 telephones or thereabouts, will keep the list of accounts prescribed in the class 'D' schedule for their exchange and toll systems, respectively, while those operating in excess of 150 telephones or thereabouts, will keep the list of accounts prescribed in the class 'C' schedule. Upon this basis of division the opportunity for development will determine the accounts to be kept as well as the development which has actually taken place. Here again, local and individual conditions must be recognized to do full justice, and in a number of instances it is possible that this arrangement must be arbitrarily varied upon sufficient cause shown to the commission.

"Any operating system in classes 'D,' 'C' or 'B,' desiring a more detailed classification than that prescribed for such class, should open the accounts prescribed for the class immediately above it, and any operating system in class 'A,' desiring a more detailed system, may go into as much subdivision and refinement of each of the submitted accounts as its interest requires, but must not re-arrange or combine any two or more of the accounts in such a manner as to interfere with the integrity of the general scheme and thus destroy the possibility for comparisons.

"The accounts prescribed for utilities as a whole may be similarly treated according to the individual requirements of each utility.

"A copy of all additional accounts and the desired subdivisions of the prescribed accounts must be filed with the Railroad Commission before such accounts are opened. All records and accounts, including those which are an enlargement, subdivision or refinement of the prescribed accounts, are to be open at all times to the examination of this Commission.

"In order that this system may meet in a most satisfactory manner with the needs of the telephone interests, consistent with the requirement of the Public Utilities Law, it is urged that all companies which are unable for any reason to conform their accounts for any operating system to the accounts for the class in which it naturally comes, under the above arrangements, will communicate with this Commission, stating in full their reasons or conditions why special consideration should be given and an explanation of how complete a compliance with this system can be made."

INCOME ACCOUNT FOR UTILITY AS A WHOLE

Total Operating Revenues*	(Details).....	
Total Operating Expenses*	(Details).....	
Net Operating Revenue or Deficit*		.....
Non-Operating Revenues*	(Details)	.....
Gross Income or Deficit*		.....

DEDUCTIONS FROM GROSS INCOME.

Interest on Funded Debt	(Details).....	
Interest on Real Estate Mortgages	(Details).....	
Interest on Floating Debt	(Details).....	
Contractual Sinking Fund Requirements	(Details).....	
Amortization Reserve Requirements	(Details).....	
Miscellaneous Deductions	(Details).....	
Total		.....
Net Income or Deficit		.....

DISPOSITION OF NET INCOME.

Preferred Stock Dividends	(Details).....	
Common Stock Dividends	(Details).....	
Appropriations to Municipal Funds (Municipal Plants Only)	(Details).....	
Other Payments From Net Income	(Details).....	
Total		.....
Surplus or Deficit for Year		.....
Surplus or Deficit at Beginning of Year		.....
Adjustments During Year (Profit and Loss Account)		.....
Surplus or Deficit at Close of Year (As per Balance Sheet)		.....

* From statements of Revenues and Expenses for each exchange system and toll system operated.

STATEMENT OF REVENUES AND EXPENSES FOR EACH OPERATING SYSTEM.

A—Exchange System.

OPERATING REVENUES.

Class A and Class B.		*Class C and Class D.*	
Local Subscribers' Telephone Earnings	(Details).....	Exchange Telephone Earnings	(Details).....
Local Pay Station Exchange Earnings	(Details).....		
Rural Telephone Earnings	(Details).....	Earnings from Connecting Lines	(Details).....
Exchange Connection Earnings	(Details).....		
Toll Connection Earnings	(Details).....	Miscellaneous Exchange System Earnings	(Details).....
Miscellaneous Exchange System Earnings	(Details).....		
Total Operating Revenues	.....	Total Operating Revenues	.....

* * *

Total Operating Revenues (Brought Down).

OPERATING EXPENSES.

All Classes.

Central Office (Traffic)	(Details).....	
Wire Plant (Transmission)	(Details).....	
Substation (Terminal)	(Details).....	
Commercial	(Details).....	
General	(Details).....	
Undistributed	(Details).....	
Total of Above Items	.....	
Depreciation	(Details).....	
Contingencies (Extraordinary)	(Details).....	
Taxes	(Details).....	
Total Operating Expenses		.....
Net Operating Revenue or Deficit		.....
Non-Operating Revenues	(Details)	.....
Gross Income or Deficit		.....

B.—Toll System.

OPERATING EXPENSES.

Class A and Class B.		*Class C and Class D.*	
Commercial Toll Earnings	(Details).....		
Leased Line and Telegraph Earnings	(Details).....		
Commissions from Connecting Utilities	(Details).....	Total Operating Revenues	
Miscellaneous Toll System Earnings	(Details).....	(Toll System Earnings)	(Details).....
Total Operating Revenues (Brought Down)	.....		

* * *

OPERATING EXPENSES.

All Classes.

Central Office (Traffic)	(Details).....	
Wire Plant (Transmission)	(Details).....	
Substation (Terminal)	(Details).....	
Commercial	(Details).....	
General	(Details).....	
Undistributed	(Details).....	
Total of Above Items	.....	
Depreciation	(Details).....	
Contingencies (Extraordinary)	(Details).....	
Taxes	(Details).....	
Total Operating Expenses		.....
Net Operating Revenue or Deficit		.....
Non-operating Revenues	(Details)	.....
Gross Income or Deficit		.....

SCHEDULE OF REVENUE ACCOUNTS FOR EACH OPERATING SYSTEM.

A. Operating Revenues.

Class A and Class B.	*Class C and Class D.*
Exchange Systems.	Exchange Systems.
1a. Local Subscribers Telephone Earnings. 1b. Local Pay Station Exchange Earnings. 1c. Rural Telephone Earnings.	1. Exchange Telephone Earnings.
2a. Exchange Connection Earnings. 2b. Toll Connection Earnings.	2. Earnings from Connecting Lines.
3. Miscellaneous Exchange System Earnings.	3. Miscellaneous Exchange System Earnings.
Toll System.	Toll System.
4a. Commercial Toll Earnings. 4b. Leased Line and Telephone Earnings. 4c. Commissions from Connecting Utilities. 4d. Miscellaneous Toll System Earnings.	4. Toll System Earnings.

B. Non-Operating Revenues.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A and Class B.	*Class C and Class D*
1. Messenger Earnings (Net).	1. Messenger Earnings (Net).
2a. Profit on Merchandise Sales (Net). 2b. Wiring and Installation Work (Net). 2c. Rents from Land and Buildings (Net). 2d. Rents from Conduit, Pole and Wire Lines (Net). 2e. Private Line Earnings (Net). 2f. Miscellaneous Non-Operating Revenues (Net).	2. Miscellaneous Non-Operating Revenues (Net).

SCHEDULE OF REVENUE ACCOUNTS FOR UTILITY AS A WHOLE.

Non-Operating Revenues.

1. Sub-licensee Revenue (Net).
2. Interest on Deposits.
3. Interest and Dividends from Investments.
4. Appropriations from Municipal Funds (Municipal Plants Only).

SCHEDULE OF OPERATING EXPENSE ACCOUNTS FOR EACH OPERATING SYSTEM.

Classes A, B, C and D.

Exchange Systems.

1. Central Office (Traffic):
   - A. Manual.
   - B. Automatic.

II. Wire Plant (Transmission).
III. Substation (Terminal).
IV. Commercial.
V. General.
VI. Undistributed.

Toll Systems.

1. Central Office (Traffic):
   - A. Manual.
   - B. Automatic.

II. Wire Plant (Transmission).
III. Substation (Terminal).
IV. Commercial.
V. General.
VI. Undistributed.

1. Central Office (Traffic)—A. Manual Plant.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
1a. Superintendence. 1b. Switchboard Operators. 1c. Miscellaneous Central Office Operating Labor.	1. Central Office Operating Labor.	1. Central Office Operating Labor.
2a. Rent of Central Office. 2b. Rent of Central Office Equipment. 2ca. Directory (Excluding Labor). 2cb. Power (Excluding Labor). 2cc. Miscellaneous Central Office Supplies and Expenses.	2a. Rent of Central Office. 2b. Rent of Central Office Equipment. 2c. Miscellaneous Central Office Supplies and Expenses.	2. Central Office Supplies and Expenses.
Maintenance:	Maintenance:	Maintenance:
3a. Maintenance of Switchboards. 3b. Maintenance of Central Office Equipment other than Switchboards. 3c. Maintenance of Central Office Buildings, Fixtures and Grounds.	3a. Maintenance of Switchboards. 3b. Maintenance of Central Office Equipment other than Switchboards. 3c. Maintenance of Central Office Buildings, Fixtures and Grounds.	3. Maintenance of Central Office Equipment and Buildings, Fixtures and Grounds.

Class D account inclusive of foregoing accounts: 1. Central Office Expense—Manual.

1. Central Office (Traffic)—B. Automatic Plant.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A.	*Class B.*	*Class C*
Operation:	Operation:	Operation:
4. Central Office Operating Labor. 5a. Rent of Central Office. 5b. Rent of Central Office Equipment. 5ca. Directory (Excluding Labor). 5cb. Power (Excluding Labor). 5cc. Miscellaneous Central Office Supplies and Expenses.	4. Central Office Operating Labor. 5a. Rent of Central Office. 5b. Rent of Central Office Equipment. 5c. Miscellaneous Central Office Supplies and Expenses.	4. Central Office Operating Labor. 5. Central Office Supplies and Expenses.
Maintenance:	Maintenance:	Maintenance:
6a. Maintenance of Switching Apparatus. 6b. Maintenance of Central Office Equipment other than Switching Apparatus. 7. Maintenance of Central Office Buildings, Fixtures and Grounds.	6a. Maintenance of Switching Apparatus. 6b. Maintenance of Central Office Equipment other than Switching Apparatus. 7. Maintenance of Central Office Buildings, Fixtures and Grounds.	6. Maintenance of Central Office Equipment. 7. Maintenance of Central Office Buildings, Fixtures and Grounds.

Class D account inclusive of foregoing accounts: 2. Central Office Expense—Automatic.

II. Wire Plant (Transmission).

A. EXCHANGE SYSTEMS.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
8a. Wire Plant Operating Labor—Exchange. 8b. Rent of Conduit, Pole and Roof Privileges—Local. 8c. Rent of Conduit, Pole and Roof Privileges—Rural. 8d. Miscellaneous Supplies and Expenses—Exchange.	8a. Wire Plant Operating Labor—Exchange. 8b. Rent of Conduit, Pole and Roof Privileges—Local. 8c. Rent of Conduits, Pole and Roof Privileges—Rural. 8d. Miscellaneous Supplies and Expenses—Exchange.	8. Operation of Wire Plant—Exchange.
Maintenance:	Maintenance:	Maintenance:
9aa. Maintenance of Pole Lines—Local. 9ab. Maintenance of Aerial Wire—Local. 9ac. Maintenance of Aerial Cable—Local. 9ba. Maintenance of Underground Conduits—Local. 9bb. Maintenance of Underground Cable—Local. 9ca. Maintenance of Pole Lines—Rural. 9cb. Maintenance of Aerial Wire—Rural. 9cc. Maintenance of Aerial Cable—Rural.	9a. Maintenance of Overhead Lines—Local. 9b. Maintenance of Underground Lines—Local. 9c. Maintenance of Overhead Lines—Rural.	9. Maintenance of Wire Plant—Exchange.

Class D account inclusive of foregoing accounts: 3. Wire Plant Expense—Exchange.

SCHEDULE OF OPERATING EXPENSE ACCOUNTS FOR EACH OPERATING SYSTEM.

II. Wire Plant (Transmission).

B. TOLL SYSTEM.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
10a. Wire Plant Operating Labor—Toll.	10a. Wire Plant Operating Labor—Toll.	10. Operation of Wire Plant—Toll.
10b. Rent of Conduit, Pole and Roof Privileges—Toll.	10b. Rent of Conduit, Pole and Roof Privileges—Toll.	
10c. Miscellaneous Supplies and Expenses —Toll.	10c. Miscellaneous Supplies and Expenses —Toll.	
Maintenance:	Maintenance:	Maintenance:
11aa. Maintenance of Pole Lines—Toll.	11a. Maintenance of Overhead Lines—Toll.	11. Maintenance of Wire Plant—Toll.
11ab. Maintenance of Aerial Wire—Toll.		
11ac. Maintenance of Aerial Cable—Toll.		
11ba. Maintenance of Underground Conduit—Toll.	11b. Maintenance of Underground Lines—Toll.	
11bb. Maintenance of Underground Cable —Toll.		

Class D account inclusive of foregoing accounts: 4. Wire Plant Expense—Toll.

III. Substation (Terminal).

A. EXCHANGE SYSTEMS.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
12a. Substation Operating Labor—Exchange.	12a. Substation Operating Labor—Exchange.	12. Operation of Substation Equipment—Exchange.
12b. Rent of Substation Equipment—Local.	12b. Rent of Substation Equipment—Local.	
12c. Rent of Substation Equipment—Rural.	12c. Rent of Substation Equipment—Rural.	
12d. Miscellaneous Supplies and Expenses —Exchange.	12d. Miscellaneous Supplies and Expenses —Exchange.	
Maintenance:	Maintenance:	Maintenance:
13a. Maintenance of Substation Equipment—Local.	13a. Maintenance of Substation Equipment—Local.	13. Maintenance of Substation Equipment—Exchange.
13b. Maintenance of Substation Equipment—Rural.	13b. Maintenance of Substation Equipment—Rural.	

Class D account inclusive of foregoing accounts: 5. Substation Expense—Exchange.

III. Substation (Terminal).

B. TOLL SYSTEM.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
14a. Substation Operating Labor—Toll.	14a. Substation Operating Labor—Toll.	14. Operation of Substation Equipment—Toll.
14b. Rent of Substation Equipment—Toll.	14b. Rent of Substation Equipment—Toll.	
14c. Miscellaneous Supplies and Expenses —Toll.	14c. Miscellaneous Supplies and Expenses —Toll.	
Maintenance:	Maintenance:	Maintenance:
15. Maintenance of Substation Equipment —Toll.	15. Maintenance of Substation Equipment —Toll.	15. Maintenance of Substation Equipment —Toll.

Class D account inclusive of foregoing accounts: 6. Substation Expense—Toll.

IV. Commercial.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A.	*Class B.*	*Class C.*
16aa. Pay station Salaries and Commissions.	16a. Collection Expenses.	16. Commercial Expenses.
16ab. Collection Salaries and Commissions.		
16ac. Collection Supplies and Expenses.		
16b. Uncollectible Accounts (Reserve Charge).	16b. Uncollectible Accounts. (Reserve Charge.)	
16ca. Promotion of Business Salaries and Commissions.	16c. Promotion of Business Expenses.	
16cb. Promotion of Business Supplies and Expenses.		

Class D account inclusive of the foregoing accounts: 7. Commercial Expenses.

V. General.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A.	*Class B.*	*Class C.*
Operation:	Operation:	Operation:
17a. Salaries of General Officers.	17. General Office Salaries.	17. General Office Salaries.
17b. Salaries of General Office Clerks.		
18a. General Office Rent.	18a. General Office Rent.	18. Miscellaneous General Expenses.
18b. Miscellaneous General Office Supplies and Expenses.	18b. Miscellaneous General Office Supplies and Expenses.	
18ca. Traveling Expenses of General Officers.	18c. Miscellaneous General Expenses.	
18cb. Miscellaneous General Expenses.		
19. Law Expenses—General.	19. Law Expenses—General.	19. Law Expenses—General.
20. Railroad Commission Expenses.	20. Railroad Commission Expenses.	20. Railroad Commission Expenses.
Maintenance:	Maintenance:	Maintenance:
21a. Maintenance of General Office Equipment.	21a. Maintenance of General Office Equipment.	21. Maintenance of General Office Equipment and Buildings, Fixtures and Grounds.
21b. Maintenance of General Office Buildings, Fixtures and Grounds.	21b. Maintenance of General Office Buildings, Fixtures and Grounds.	

Class D account inclusive of foregoing accounts: 8. General Expenses.

SCHEDULE OF OPERATING EXPENSE ACCOUNTS FOR EACH OPERATING SYSTEM.

VI. Undistributed.

EXCHANGE SYSTEMS AND TOLL SYSTEM.

Class A and Class B.	*Class C and Class D.*
22. Injuries and Damages.	22. Injuries and Damages.
23. Insurance.	23. Insurance.
24. Stationery and Printing.	24. Stationery and Printing.
25a. Operation of Stores Department.	25. Stores Department Expense.
25b. Maintenance of Stores Department.	
25c. Maintenance of Stores Department Buildings, Fixtures and Grounds.	
26a. Operation of Utility Equipment (Teams, etc.).	26. Utility Equipment (Teams, etc.) Expense.
26b. Maintenance of Utility Equipment.	
26c. Maintenance of Utility Equipment Buildings, Fixtures and Grounds.	

Class D accounts above may be numbered as follows in their order: 9, 10, 11, 12, 13.

Depreciation.

Exchange Systems and Toll System.
Classes A, B, C and D.
Depreciation Reserve Charge.

Contingencies (Extraordinary).

Exchange Systems and Toll System.
Classes A, B, C and D.
Contingencies (Extraordinary) Reserve Charge.

Taxes.

Exchange Systems and Toll System.
Classes A, B, C and D.
License Fees.

DEDUCTIONS FROM GROSS INCOME OF UTILITY AS A WHOLE.

Contractural Accounts.

1. Interest on Funded Debt.
2. Interest on Real Estate Mortgages.
3. Interest on Floating Debt.
4. Contractural Sinking Fund Requirements.

RESERVE ACCOUNTS FOR UTILITY AS A WHOLE.

Required Permanent Reserves.

1. Depreciation Reserve.
2. Sinking Fund Reserve.
3. Amortization Reserve.

Optional Reserves.

1. Maintenance Reserve.
2. Uncollectible Accounts Reserve.
3. Injuries and Damages Reserve.
4. Insurance Reserve.
5. Unearned Rentals Reserve.
6. Directory Reserve.
7. Other Line Reserve.

SCHEDULE OF STOCK ACCOUNTS FOR UTILITY AS A WHOLE.

Materials and Supplies.

SCHEDULE OF CONSTRUCTION AND EQUIPMENT ACCOUNTS FOR EACH OPERATING SYSTEM.

Exchange Systems and Toll Systems.

All Classes.

Intangible:
1. Organization.
2. Rights, Licenses, etc.

Tangible:
3. Land (used in operation of property).
   a. Central Office Land.
   b. General Office Land.
   c. Stores Department Land.
   d. Utility Equipment Land.
4. Buildings, Fixtures and Grounds (used in operation of property).
   a. Central Office Buildings, Fixtures and Grounds.
   b. General Office Buildings, Fixtures and Grounds.
   c. Stores Department Buildings, Fixtures and Grounds.
   d. Utility Equipment Buildings, Fixtures and Grounds.
5. Central Office Equipment (Manual).
   Class A and Class B.
   a. Switchboards.
   b. Central Office Equipment other than Switchboards.
   Class C and Class D.
   c. Central Office Equipment (Manual).
6. Central Office Equipment (Automatic).
   Class A and Class B.
   a. Switching Apparatus.
   b. Central Office Equipment other than Switching Apparatus.
   Class C and Class D.
   c. Central Office Equipment (Automatic).
7. Wire Plant Construction and Equipment:
   A. *Exchange Systems of Class A and Class B.*
      a. Pole Lines—Local.
      b. Aerial Wire—Local.
      c. Aerial Cable—Local.
      d. Underground Conduit—Local.
      e. Underground Cable—Local.
      f. Pole Lines—Rural.
      g. Aerial Wire—Rural.
      h. Aerial Cable—Rural.
   B. *Exchange Systems of Class C and Class D.*
      a. Wire Plant Construction and Equipment—Exchange
   C. *Toll Systems of Class A and Class B.*
      a. Pole Lines—Toll.
      b. Aerial Wire—Toll.
      c. Aerial Cable—Toll.
      d. Underground Conduit—Toll.
      e. Underground Cable—Toll.
   D. *Toll Systems of Class C and Class D.*
      a. Wire Plant Construction and Equipment—Toll.
8. Substation Equipment:
   A. *Exchange Systems of Class A and Class B.*
      a. Substation Equipment—Local.
      b. Substation Equipment—Rural.
   B. *Exchange Systems of Class C and Class D.*
      a. Substation Equipment—Exchange.
   C. *Toll Systems of All Classes.*
      a. Substation Equipment—Toll.
9. General Office Equipment.
10. Stores Department Equipment.
11. Utility Equipment (Teams, etc.).
12. Miscellaneous Equipment.
13. Miscellaneous Construction and Equipment Expenditures:
    a. Salaries.
    b. Office Supplies and Expenses.
    c. Stationery and Printing.
    d. Law Expenses.
    e. Injuries and Damages.
    f. Insurance.
    g. Taxes.
    h. Interest.
    i. Discount on Bonds.
    j. Miscellaneous.
14. Cost of Plant Purchased (in lieu of Plant Constructed).

BALANCE SHEET FOR UTILITY AS A WHOLE.

Assets.

Property and Plant:
  Cost Beginning of Year.
  Construction and Equipment Current Fiscal Year.
  Cost Close of Year.
Treasury Securities:
  Treasury Stock.
  Treasury Bonds.
Investments:
  Stocks and Bonds of Other Companies.
  Other Investments.
Reserve, Sinking and Special Fund Assets:
  Depreciation Reserve Fund.
  Sinking Fund.
  Amortization Reserve Fund.
  Special Funds.
Current Assets:
  Cash.
  Notes and Bills Receivable.
  Accounts Receivable.
  Interest and Dividends Receivable.
  Materials and Supplies.
  Sundry Current Assets.
Prepaid Accounts:
  Prepaid Insurance.
  Prepaid Taxes.
Prepaid Interest.
  Sundry Prepaid Accounts.
Open Accounts:
Deficit:

Liabilities.

Capital Liabilities:
  Capital Stock Preferred.
  Capital Stock Common.
  Funded Debt.
Mortgage Liabilities:
  Real Estate Mortgages.
  Other Mortgages.

Current Liabilities:
- Notes and Bills Payable.
- Accounts Payable.
- Matured Interest on Funded Dept Unpaid.
- Dividends Unpaid.
- Deposits.
- Sundry Current Liabilities.

Accrued Liabilities:
- Insurance Accrued.
- Unmatured Interest on Funded Debt Accrued.
- Unmatured Interest on Notes and Bills Payable Accrued.
- Dividends Accrued.
- Sundry Liabilities Accrued.

Open Accounts.

Reserve, Sinking and Special Fund Liabilities:
- Depreciation Reserve.
- Sinking Fund.
- Amortization Reserve.
- Special Funds.

Surplus.

Central Office Locations.*

The trunk mileage is the quantity next in order to be determined, and this work involves the determination of the number of trunk calls between the various exchanges. A good way in which to begin this work is to number each office, beginning with number one, and on up, and to make up two tables.

This will insure the work being kept in systematic order, and insure efficiency in obtaining accurate results. Two tables are necessary, for the reason that the number of trunks from one office, called No. 1, for example, to office No. 2, to handle the calls originating in office No. 1, will in all probability not be the same in number as those required between them to handle the calls from office No. 2. And, again, each office has several groups of outgoing and incoming trunk circuits between it and every other office, so it becomes necessary to distinguish between the outgoing and incoming trunks, and the table method given has proven particularly satisfactory in view of these conditions. No mathematical formula has been deduced which will serve to derive the number of trunked calls during the busy hour between any two exchanges. The methods used, however, are based upon self-evident facts, resulting from conditions of operating between two average exchanges. The relation that the subscribers bear to each other, socially and in a business way, has a great deal to do with the number of trunked calls, and consequently the number of trunks needed. As an example of the effect just noted, sometimes called the community of interest, assume, for an example, two districts, one of which is a suburb in which nothing but high-class residences are found, and the other a local business center adjoining the suburb. When household supplies, such as groceries, etc., are needed, the natural method of obtaining them is to call up the proper store in the local business section and ordering the materials needed. The call thus made must be a trunk call, as it is for a subscriber lying in another exchange district. Again, many men communicate with their families before leaving the office for home, or vice versa, and all such calls must be trunked to the suburban circuit. When a study is made of such a condition, it will be sometimes found that more than 50 per cent of the busy hour calls originating in such a suburban district are trunk calls, and the community of interest is determined by the per cent of the originating calls which these trunked calls supply. For comparison purposes, and in the absence of actual data for the districts which are being studied, it is assumed that 60 per cent of the originating calls in each exchange are trunked calls.

After the number of trunked calls is ascertained the determination of the number of "A" positions can be completed. According to the curve assumed, with a trunking percentage of 60, 180 calls can be handled by each operator. Hence, dividing the total number of originating calls during the busy hour by 180, will give as a result the number of "A" positions necessary to handle the busy hour traffic where that trunking ratio holds.

Returning to the methods for determining the number

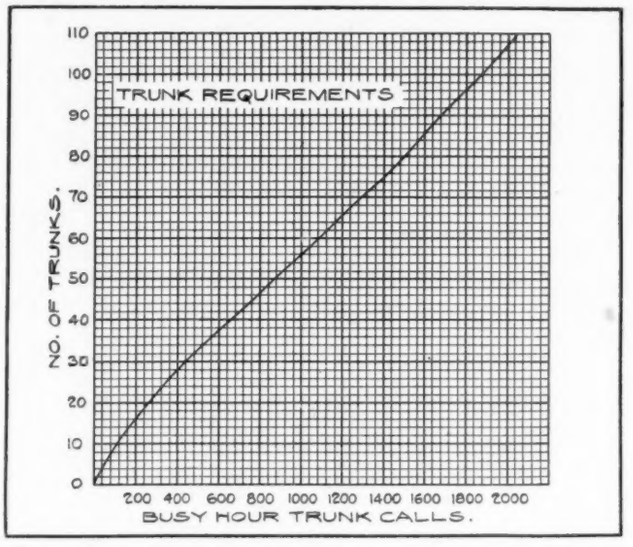


Fig. 30—Curve Indicating Number of Trunks Required to Handle Traffic.

of local trunks, it is noted that the last figure determined was the number of originating trunk calls from each exchange, by applying the percent of trunking to the total originating busy hour calls. In order to determine the number of outgoing and incoming trunks more than this must be known, namely, the number of calls between each office and every other. The formula for determining the per cent of outgoing trunk calls from one office to any other office is $100 \frac{A-B}{A} \times .60$, where A equals the total number of lines in the entire multi-office territory, B the number of lines in the office district under consideration, and .60 the community of interest. The community of interest is analagous to the per cent of trunking that may be expected between the two exchanges. Applying this formula for each office district, the number of outgoing trunk calls can be obtained. The incoming trunk calls for any office is the sum of the outgoing calls from every other office to it. The number of outgoing and incoming trunk circuits required depends upon two things: first, the number of calls between two points under consideration, and, second, the length of time consumed per call. The length of time that a circuit is used during a conversation, or for connecting two telephones, is known as its holding time. This is, of course, a variable quantity, not only for the same class of circuits, but for various circuits of any class.

The theoretical holding time for a local trunk circuit is 2 minutes, and with this as a basis, one trunk will handle 30 conversations during the busy hour. However, actual practice seems to indicate that this holding time is underestimated, and from the results of exhaustive traffic studies, the holding time of the local trunk has been increased to 4 minutes. This means that but 15 calls may be handled per trunk during the busy hour. Neglecting the additional pairs, which in designing the plant are always provided to afford flexibility, the curve shown in Fig. 30 has been constructed. Knowing the number of calls from one exchange, that are trunked to another, the trunk circuits

*Concluded from issue of October 9, 1909.

may be read directly from the curve. It should be noted that the trunking efficiency increases in direct proportion to the number of trunks, and for this reason the curve does not assume the form of a straight line as it would were it based on a constant efficiency. Having the number of trunks, between each point and every other, the trunk mileage is determined by multiplying each number by the corresponding distance.

The number of "B" positions in each office depends upon three things: 1. The number of lines within any particular district. 2. The number of incoming trunk calls. 3. The number of call circuits. The total number of lines in each exchange district is known, and as previously stated, the number of incoming calls will be the sum of all of the outgoing calls from the other exchanges for the exchange in question. The unknown quantity, then, is the number of call circuits or order wires. It is determined that a "B" operator can complete 400 connections during the busy hour betwen her exchange and any other, where one call circuit connects the two exchanges. The formula for determining the number of call circuits is based on this assumption, and is $N=T=400$, where N is the total number of offices trunking to the office under consideration, and T the total number of incoming trunk calls. Where more than one office is on a call circuit, the number of connections that can be made by the "B" operator during the busy hour is reduced. Dividing the total number of incoming trunk calls by the number that can be handled per "B" operator during the busy hour, will give the number of "B" positions.

IDEAS OF THE WORKERS

How a Cable Unhooked Itself.

A crew of men, under the writer's supervision, were transferring a lead of 75 pr. cable, attached to its messenger, from an old line of poles to new supports. We had about 500 ft. hung on the new messenger, and were closing up the job when, without any cause which we were able to discover, about 100 ft. of the cable fell. The movement stopped for an instant, as the rest seemed to ask why it should stay up there, and then one hanger after another freed itself from the messenger and toppled over until all the cable which had been transferred and several spans which were left on the old line of poles lay upon the ground. The cable was clipped in with marlin cable hangers, and when the cable fell it just unhooked itself from the messenger and never bent or broke any one of the hangers. I had the men take the hangers from the cable, and out of several hundred clips I found one clip that was bent, and one of the marlin cords broken; nothing else looked wrong. I can think of only one way to explain this remarkable accident. As each hook jumped from the messenger, the cable seemed to bend upward just enough to unhook the hanger ahead.

There was only one man injured when the cable came down, and he was not hurt seriously. This was almost miraculously fortunate, as there were many people on the street and the time from the moment the cable started to fall until it was all on the pavement was about as long as it would have taken a fast train or an automobile to make the distance.

Carrollton, Georgia. Cecil A. Turner,
Foreman of Construction, Gainesboro Tel. Co.

How to Get a Test by the Rural Rubberneck.

Do you, Mr. Troubleman, ever have a bell go wrong? Does it stick or get out of adjustment? You fix it? All right! How are you going to know it is fixed, unless you sit down quietly and play with the subscriber's children until some subscriber or else "Central" happens to ring?

I think I hear you say, "don't wait; call "Central" and have her ring you."

Did you ever try it? How many receivers were down when "Central" rang out? Only about six, that is not many.

Now we have condensers in most of our telephones in this exchange, but there seems to be more or less leakage when the receivers are off. Did you every try a plan to make these "rubbernecks" hang up? We have one, and here it is:

Have a code word to use when you call "Central." When you think you have your bell adjusted call her up. Perhaps the code word is "Keys." Then ask "Central" how those listening keys are working; talk about the roads, the weather, anything you think of, then say good-by. Everyone will hang up and the line will be clear. The word "keys" means "ring me." We change the word quite often, using "corn," "frost," "lunch," "well," etc.

For instance, I say "Well, I guess this is O. K.; now I must be going." If I still need another ring use the word "repeating coil." That means, "ring me until I say that's good."

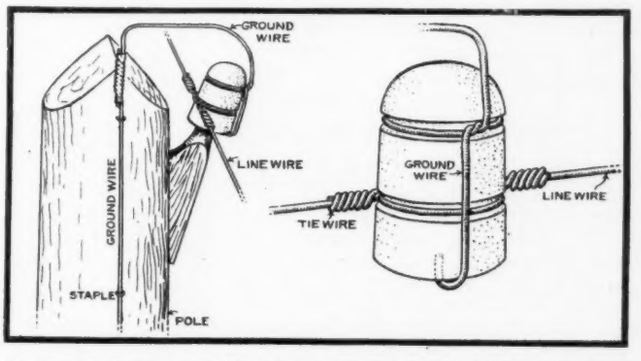
When you have got your ring on a clear line by this little trick you can go out and untie your mules and go your way rejoicing that you fooled the "rubbernecks."

Vail, Iowa. "B."

An Insulator Lightning Discharge Gap.

We use a device such as is shown in the accompanying diagram to relieve our lines of lightning charges. The only material required is a piece of No. 12 iron wire and a double groove porcelain insulator.

We bend the piece of iron wire to make a hook about one-half inch deep, to clasp the bottom of the insulator. The line wire is placed in the lower groove and tied in the regular way. The wire carrying the hook is then set in place on the rim of the insulator, properly bent, tied in the upper groove, and connected to a ground wire. Between this and the tie wire there will be a small gap, the width of which can be regulated



Method of Making and Installing an Insulator Lightning Discharge Gap.

by the lineman, which will provide an escape to ground for lightning. The hooked wire must be drawn tightly around the groove so that it cannot move, and ground the line.

Scott City, Kansas. Lincoln Newsom,
Proprietor Scott City Telephone Exchange.

Fruit Thieves Intercepted by Telephone.

Two men went out to a farm near Binghamton, N. Y., and stole a wagon load of pears.

As the owner of the property was delivering milk in the city, his wife communicated with him by telephone. She gave a description of the outfit by which it could easily be identified. Accompanied by a detective the farmer started out and soon the men were "caught with the goods."

What the Law Decides

By A. H. McMillan

Power of City to Fix Maximum Rates.

The charter of the city of Jacksonville contains the following provisions, viz: "The mayor and city council of the city of Jacksonville are hereby authorized by ordinance to regulate, require and provide for the opening, grading, paving, improving and repairing of any and all streets, and to require the owner of lots fronting or abutting thereon or contiguous thereto and specially benefited thereby to do such work, or to pay the cost thereof, or to pay such part of the cost thereof as may be fixed by ordinance, * * * to pass all ordinances necessary for the health, convenience and safety of the citizens, and to carry out the full intent and meaning of this act, and to accomplish the objects of this incorporation." A telephone company was operating in that city under an ordinance which contained no condition or provision fixing maximum telephone rates or reserving the power in the city to fix such rates. Subsequently the city council passed an ordinance fixing the maximum rates for telephone service as follows: For single telephone with individual service in any business office or place of business, four dollars per month; for single telephone with individual service in any residence or private dwelling, two dollars per month. The telephone company sought an injunction to restrain the city from enforcing this ordinance.

The Duval County Circuit Court granted an injunction as prayed, which order was affirmed by the Supreme Court of Florida, the holding being that the city had no power or authority to pass the latter ordinance.

Chapter 4052 of the laws of 1891, conferred upon municipalities the power to forfeit the franchises of any telephone or other company under which it was using the streets upon the violation of the terms and conditions of its grant, or upon failure to comply with any reasonable provisions of any ordinance regulating the use of the streets by the company. These provisions were held not to confer upon a municipality, the power to fix maximum telephone rates as attempted.

City of Jacksonville vs. Southern Bell Tel. & Tel. Co., 40 Southern, 509.

Care of Poles on Country Road.

A man was traveling along a country road in a one-horse rig on his way from Centralia, Washington. When he reached a point opposite a pole belonging to the Pacific Telephone & Telegraph Company, a tree, which was being cut by a person some six hundred feet away, accidentally fell upon the telephone wires, causing them to bend and sag, and putting a strain upon the poles. The strain pulled over a pole, which broke off at or near the surface of the ground, and fell on the passerby causing him severe injuries. The pole was of cedar and was set in place in 1892. The soil in which it was set was of a gravelly character and there was evidence that the pole was rotten and decayed at the butt. One witness testified that a pole of this character on that ground had an average life of five or six years; another that it would last from four to ten years. The pole stood at an angle in the road and the guy wire which held the pole in position had been cut some time before and no effort had been made by the Telephone Company to replace it. The man, who was a farmer and carpenter, sued the telephone company, and the jury returned a verdict of $3,750 and costs.

In the United States Court of Appeals, the judgment was sustained, the court holding that the telephone company was bound to exercise care to maintain its poles in a reasonably safe condition. The court held that, as the negligence of the telephone company was concurrent with that of the person who felled the tree on the wire, both were liable jointly or severally for the damage.

Pacific Tel. & Telegraph Co. vs. Parmenter, 170 Fed., 140.

Use of Connecting Device Enjoined.

Circuit Judge Mandell, at Detroit, Michigan, has issued an injunction on behalf of the Michigan State Telehone Company, restraining the Home Telephone Company from the use of a device which placed private switchboards of the plaintiff company at the disposal of the subscribers of its younger rival. The device is a stand containing Home telephone connections, standing so close to the interior switchboard of the Michigan State Telephone Company that the connecting plugs of the switchboard could be used in connecting the two systems. Such devices, it was alleged, had been installed in a number of Detroit business establishments.

The injunction prohibits the defendant company under penalty of $10,000 from establishing any more such stands, and requires it to cut off connection with any now used for establishing physical connection between the two systems. If the jacks in the apparatus, used for connections, are sealed up, the portion of the injunction requiring disconnection between them and the central office of the Home Telephone Company is abated. The defendant is given leave to move to modify the injunction.

Answers to Practical Questions

Run Grounded Lines Metallic Through Cable.

How would you advise working grounded farm lines on a board? Would it be best to ground them at the main frame, or work them metallic through the cable and ground them at the terminal pole?

You will find it better to run the lines metallic through the cable, and ground at the terminal pole. The reason for this is on account of the close proximity of wires in a cable. If lines were run on single wires there would be a great deal of cross-talk and ringing induction between lines, which is entirely overcome by the use of the twisted pair, and grounding at the terminal pole. At the same time it provides for the future, when all lines will be converted into metallic lines, thus giving you a metallic pair through the cable, all ready for this change whenever it may occur.

How Adding Telephones Affects Resistance of Line.

Will you please tell me through the columns of your paper the amount of resistance a telephone adds to the line? For instance, when I install a 2,000 ohm ringer telephone on a rural line, do I add 2,000 ohms resistance to the line?

A 2,000 ohm bell added to a line will not add 2,000 ohms to the resistance, since it is connected across the wires and not in series. (See Fig. 1) It really lowers the resistance as measured from the central office. If you neglect the resistance of the wires the rule is to divide the re-

sistance of one bell by the number of bells, provided all bells are of the same resistance. Thus, three 2,000 ohm bells bridged on a line of zero resistance will measure

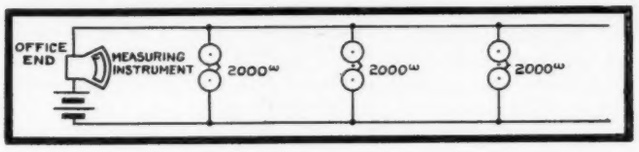


Fig. 1.

jointly 2,000 ÷ 3 = 667 ohms; four of them will measure 2,000 ÷ 4 = 500 ohms, etc.

Common Battery for Transmitters on Magneto Board.

In feeding switchboard transmitters from storage battery, what is the objection to using the battery in sets of proper voltage, one set for each transmitter? This would give a local battery to each transmitter, which we are now supplying with bluestone cells, and would do away with the trouble and inconvenience of keeping them up.

In case the local battery scheme would not work with storage cells, what would be the proper arrangement and resistance of coils for feeding three common battery, high resistance transmitters from one 22-volt storage battery. How much current would each transmitter require? What should be the capacity of the condensers used?

Some of the objections to having a storage battery for each operator's transmitter are as follows: The battery and charging outfit cost too much to install and operate, as extra costs include not only extra batteries but additional wiring and switches, and extra labor and inconveniences in charging. A common battery would overcome these special disadvantages. The storage battery must be kept in a room with outside ventilation, as the fumes are very injurious to all telephone apparatus and cable.

2. In furnishing current to transmitters from a storage battery common to the entire board, where high resistance transmitters are used, a 2 m. f. condenser and retardation coil are wired into each primary circuit. One method of wiring is indicated in the accompanying diagram. The wiring of the secondary circuit may have to be modified to provide for the busy test on the board you use. Ask the manufacturer of your switchboard transmitter about

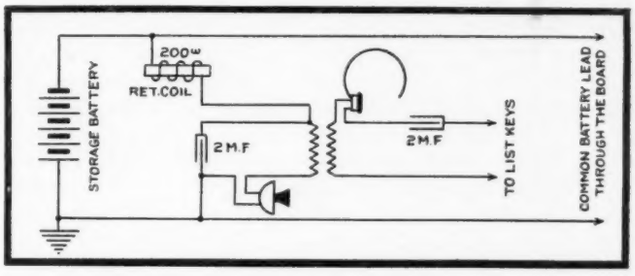


Fig. 2.

the proper retardation coil to use. The condensers shown in the receiver circuit are not required except when used for common battery boards.

News of the Field

INTERNATIONAL CONVENTION, AUDITORIUM HOTEL, CHICAGO, DEC. 7, 8, 9.

Texas, Dallas, Oct. 28; Illinois, Decatur, Nov. 10-11.

Ninth Indiana District Association Meeting.

The ninth district of the Indiana Independent Telephone Association held its quarterly meeting at the office of the Fountain County Telephone Company, at Covington Ind. The following counties are comprised in this district: Benton, Clinton, Fountain, Montgomery, Tippecanoe and Warren.

The meeting was called to order last week by Vice-President F. O. Cuppy, of Lafayette. The companies were represented by the following gentlemen:

W. B. Coffing and J. M. Miller, Fountain County Telephone Co., Covington; Frank F. Hesus, Shawnee Telephone Co., Stone Bluff; John L. Osborne, Veedersburg Telephone Co.; B. S. Orr and William Colvert, Attica Telephone Co.; Mr. D. Thewlies, Linden Telephone Co.; Mr. Wright, Waynetown & Hillsboro Telephone Co.; Mr. Lutzes, Odell Telephone Co.; F. O. Cuppy, Lafayette Telephone Co.; George Galley, Stone Bluff Telephone Co.; F. F. Doherty and J. K. Johnston, Home Telephone Co., Crawfordsville.

The question of the New Richmond Telephone Company's connection with the Bell telephone company was taken up and discussed, and it was decided that the District Association stand by the Home Telephone Company, of Crawfordsville, in severing connection and not allowing any messages to or from New Richmond, and the different companies pledged themselves not to send or receive any messages to the company at New Richmond until such time as that company shall declare themselves either Bell or Independent. This movement will practically shut out the New Richmond Telephone Company from the Independent connections of the outside world through the Linden Telephone Co., Lafayette Telephone Co., Home Telephone Co., Crawfordsville; Odell Telephone Co., Waynetown, Hillsboro and Covington Telephone Companies.

The meeting was adjourned to meet at Crawfordsville the 12th of January, at which time the different representatives will have an opportunity to inspect the system now being installed at that point.

The Illinois Convention.

The Fifth Annual Convention of the Illinois Independent Telephone Association is to be held in the Home Telephone Building, at Decatur, Ill., November 10 and 11, 1909. The officers and various committees have been putting forth untiring efforts during the past several month to make this a most interesting and helpful meeting, and it will be to the interest of Independent telephone men of Illinois to attend if at all possible. One of the special points to be considered in the meeting is the clearing house plan, and the manager of the Indiana Independent Clearing House, Mr. J. W. Coffey, will be present to speak on this subject. A most hearty invitation is extended to all Independent telephone men to attend this convention, whether members of the association or not.

The officers of the association are: Manford Savage, president, Champaign; W. H. Bassett, vice-president, St. Louis, Mo.; C. A. Camp, secretary, Henry; A. F. Loehr, treasurer, Carlinville.

The Executive Committee includes Manford Savage, W. H. Bassett, C. A. Camp; C. B. Cheadle, Joliet; L. A. Herrick, Freeport; J. W. Barrett, Pekin.

Convention committees include: Arrangement—James A. Portwood, J. W. Collins, W. G. Olwin. Program—C. A. Camp, C. B. Cheadle, J. S. Daily. Reception—Manford Savage, Champaign, chairman; W. H. Ramsey, F. C. Wood, Dr.

J. W. Collins, George M. Meyers, W. H. Bassett, R. C. Critfield, E. S. Sterrett, G. E. Wombacher, James Barrett, J. S. Drowyer, H. R. Ainsthorpe, L. A. Herrick, Albert Shuler, A. J. Vernier, C. M. Irwin, A. F. Loehr, A. G. Hawley.

Consolidation Plans in Vicinity of Columbus, Ohio.

At a meeting of the board of directors of the Columbus Citizens' Telephone company of Columbus, O., authority was given the executive committee to negotiate with the United States Telephone company of Cleveland looking toward the purchase of the Independent plant at Lancaster, O. If terms can be arrived at which will be mutually agreeable the sale will probably be closed in a few weeks.

The Lancaster company has $100,000 of common stock, of which $74,000 is owned by the United States Telephone Company. The issue of preferred stock amounts to $23,000, of which $6,700 is held by the same corporation. If the property is taken over these blocks will be purchased by the Columbus Citizens' company. Plans which have been started by the Columbus Citizens' company look towards the final acquisition of the Independent plants and rural lines at Marion, O., Circleville, Washington, C. H., Delaware, and other towns in Central Ohio.

President Frank A. Davis and Secretary-Treasurer E. R. Sharp of the Columbus company recently went to London, O., to take preliminary steps in the reorganization of the Madison County Telephone Company, recently acquired by the Columbus concern. The London company will maintain its corporate existence by the election of new directors and officers. These will be men connected with the Columbus Citizens' company. Plans are progressing satisfactorily for a thorough overhauling of the plant in London and also the improvement and extension of rural lines.

Status of the Rochester Rate Increase Ordinance.

The common council ordinance recently adopted by the aldermen of Rochester, N. Y., permitting the Rochester Telephone Company to increase its unlimited business service rate from $48 to $60 per year is vetoed by the mayor because the franchise amendment, or ordinance, was so drawn that it did not include territory now in the city which was not a part of the city when the telephone frachise was granted in 1899, also because the increased rate was granted in perpetuity. The mayor returns the ordinance, suggesting amendment on those two points.

There is no valid reason why the aldermen should not so amend and the company expects they will. Delay, however, will undoubtedly be made until the latter part of November at least. The company's plans for extensions are necessarily held up by the delay.

At a meeting of the councilmen, October 19, the ordinance was referred back to the Law Committee.

In returning the ordinance the mayor wrote:

"I am fully alive to the public interest that has been excited during the two years which have elapsed since the petition of the telephone company asking for a change in its rates was presented to your board, and to the importance to the financial interests affected by a change in the proposed agreement.

"I have carefully studied the telephone situation presented in this city in its present aspects, and particularly with reference to the future. It may be that the existing rate for business telephones, as fixed by the existing agreement, is too low. It is equally probable that the increased rate, permitted by your proposed amendment to that agreement, will, during the life of the contract, prove too high.

"By this contract the City of Rochester has given a perpetual right to a public service corporation. Within ten years after it was granted, the company has asked for relief by an increase of rates. In view of the fact that said contract is perpetual, it seems to me that a provision should be inserted by which the rights of the city will be safeguarded by giving the common council, with the approval of the board of estimate and apportionment, and the mayor of the City of Rochester, full power and authority to restore, in whole or in part, the present rates for telephone service in the City of Rochester.

"The new contract should also contain a provision which makes it effective in the City of Rochester *as it now exists, or may hereafter exist, by the annexation of new territory.*

The legal point in the amendment has immediately to do with two large city wards, taken into the city about three years ago, the Twenty-first and Twenty-second. Expert lawyers consulted by Mayor Edgerton agreed that the wording of the ordinance was uncertain as to these, and probably left them out of the benefit of the rate increase. The territory which will undoubtedly be taken into the city within a few years was also not dealt with in the amendment and, as an area approximately a mile wide all around the city will be annexed, the point is important. If the council passes a new ordinance the company will have these additional points covered.

Big Improvements Made by Cuyahoga Company.

Few people realize how rapidly the Cuyahoga Telephone Company of Cleveland, Ohio, is developing its plant, and preparing for a great increase in business. The letter which President Tillotson sent to stockholders recently gives an idea of the progressive policy of expansion which is being carried out, as well as of the sound financial condition of the property. President Tillotson said:

"Since January 1st of this year, this company has expended and contracted to expend over $400,000 for permanent improvements and extensions, from funds received from the sale of its collateral trust notes and from net earnings. It has reserved 23¼ per cent of its gross earnings for maintenance and renewals and has used nearly all of the reserve for the purpose. This percentage has been found sufficient by some of the most conservative and prosperous telephone companies in the country; and experience so far indicates that it meets our requirements. The plant is in a better condition than ever before; and it is the intention of the management to maintain and improve its physical condition wherever needed.

"The development of the company's business has been constant and these improvements will add materially to its prosperity. Other additions will be made from the resources of the company as fast as conditions permit. Over seven trench miles of conduit have been laid and nine miles of conduit previously laid will be used in place of aerial work now in use. A new switchboard in the Crest Exchange in East Cleveland has just been completed, and will do much to relieve the congested condition in that building. A new building of 7,000 lines capacity on East 81st street is nearing completion. It is absolutely fireproof and will be ready for occupancy about November 1st, and in operation soon after January 1, 1910.

"The company has made no effort to enlarge its list of subscribers because its plant has been overloaded, but conditions will soon permit an active canvass for new business. Notwithstanding the lack of aggressive effort the number of our subscribers has materially increased during the year."

La Crosse Wants to Chop Down Bell Telephone Poles.

The city council of La Crosse, Wis., has ordered the Board of Public Works to send out men to cut down poles of the Wisconsin Telephone Company occupying land intended for park purposes.

Keystone Company in Continental Family.

Arrangements have been completed whereby the Keystone Telephone Company, the big Independent system which operates in Philadelphia and immediate suburbs, will be joined with the Continental Telephone Company, chartered with $50,000,000 capital in the state of New Jersey a few days ago.

Arrangements have also been practically completed whereby the American Union Telephone Company, of Harrisburg, with its immense network through more than two-thirds of the counties of Pennsylvania, will also work with the new Continental system, while other Independent lines of the state which are not parts of the systems of either the Keystone or the American Union are also going into the new organization to unite on long distance work.

This assures Independent patrons in all counties of the state, a service the equal of any in the world. The details which have just been completed or which are being completed have been under way ever since the project of a long-distance concern for this section was first broached, and Independent subscribers have been awaiting impatiently the time when the deal would be consummated. Judging from comments made by the press throughout Pennsylvania, all of the Independent people are very well satisfied, and look forward to an early increase in toll receipts.

The Keystone, American Union and other companies which have entered into traffic agreements with the Continental will work under a mileage pro-rata system of dividing earnings.

UNCLE SAM—"WHAT DO YOU RECKON HE MEANS BY THAT?"
WE ALL USED TO REJOICE IN AN UNCLE SAM WHO WAS HONEST, FEARLESS, SELF-RELIANT—A FINE OLD CHAP * * * * * * * NO TRUTHFUL CARTOON OF UNCLE SAM OF THIS DAY COULD PRESENT SUCH A FIGURE AS THAT * * * * * * * WOULD BE SUPPLANTED BY CUNNING, SUSPICION, AND WITHAL A CERTAIN SYCOPHANCY DENOTING DETERIORATION OF INDEPENDENT MANHOOD—
AUGUST BELMONT
BRIGGS
Reproduced by Courtesy of the Chicago Tribune.

Does August Belmont Know Anything About the Telephone Business?

Prospective Change of Control of Ohio Independent Long-Distance Lines.

The incorporation of the Ohio Home Telephone Company, with an authorized capital of $500,000, under Ohio laws, Friday, October 15, is said to complete negotiations carried on among Columbus and Cleveland capitalists for the leasing of the property of the United States Telephone Company, of Cleveland. The incorporation was made by attaches of the Columbus office of Otis & Hough, F. L. Griffith, Harlan Reed, Howard Howells, W. C. Henderson and John H. Otto.

For weeks negotiations have been carried on for the formation of a new concern to be controlled by the various Independent telephone companies of the state, to operate the lines of the United State Telephone Company. The final agreement was made in Cleveland last week, and the incorporation papers were immediately filed. Plans are for the new concern to have charge of the operation of practically all the Independent long distance lines in the state, and guarantee dividends on the stock and interest on the bonds of the United States company. It is understood that all the stock of the leasing company has been subscribed, and arrangements for the transfer are practically completed.

Injunction Denied at Des Moines.

Although strong arguments were made which lead to the general belief that the law was in favor of the complainants in the case, the injunction restraining the consummation of

the lease of the Mutual plant of Des Moines by the Iowa Telephone Company was denied by Judge McHenry in the Polk County District Court.

Arguments before the court were made for the Bell company by N. T. Guernsey, probably Iowa's leading attorney. For the complainants Crom Bowen, J. D. Wallingford and Judge M. G. Reynolds, of St. Louis, appeared. Mr. Bowen made a strong opening presentation of the case, and Judge Reynolds closed with one of the most brilliant arguments which has ever been heard in an Iowa court. The arguments of attorneys were exclusively confined to points of law.

The city has filed suit to ascertain the franchise rights of the Bell company.

It is not known just what character further action to prevent the consummation of this merger will take, but it is probable that an announcement will be made in next week's TELEPHONY.

Prospect for Increased Earnings from Long-Distance Operation of Montana Independent.

The directors of the Montana Independent Telephone Company, at a meeting held in Butte a few days ago, declared another dividend of one per cent on the stock of the company, payable November 1 It is the regularly quarterly dividend and the fifth dividend declared this year —four regular and one extra, the extra paid August 1. At the meeting it was also decided to advance the price of the treasury stock to par, $10. It had been selling at 14 shares for $100, or little more than $7 per share. It is anticipated that next year the company will pay at least 8 per cent on the stock. Twelve out of the 13 directors of the company attended the meeting. Those present were H. A. Galway, president; W. H. Hall, vice-president; C. J. Kelly, C. F. Kelley, M. S. Largey, J. J. Flanigan, J. T. O'Brien, Patrick Wall, H. B. Brown, Frank H. Clinton and Thaddeus S. Lane.

The report of Auditor Donald Arthur was received and approved. The report showed a very gratifying condition of the company. Managing Director Lane reported that the company now has 4,670 telephones in operation and 186 orders are unfilled, the telephones in operation being in Butte, Anaconda and Deer Lodge. The long-distance line to Deer Lodge has just been completed, and connections have been completed to Billings on the east and Helena on the north. By November 1 the company will have completed long-distance service to Great Falls. Mr. Lane also reported progress in the Bitter Root valley work. The concrete work for the exchange at Missoula has been completed, and one-half of the underground subway system in Missoula will be open for service about January 1. The company is also building an exchange at Stevensville, which will be open by November 15. An exchange is also being built at Hamilton, and a toll line is being extended from Missoula to Hamilton and from Missoula to Deer Lodge.

By April 1, 1910, said Mr. Lane, the long-distance connection with Spokane will be completed.

The completion of these connections will tend to still further strengthen the company's claims for local business, and it is anticipated that earnings from the toll lines will be good from the start.

Old Free Service Contracts With City Not Invalidated by Wisconsin Public Utilities Law.

A decision of Justice Marshall of the Wisconsin supreme court holding that the Douglas County Telephone company can give certain city hall offices in Superior free service, does not allow public utility companies to make general discriminations, as first glance would indicate. Only those places having contracts for such free service prior to the passage of the public utilities law may enjoy such service. Racine is the only other important place having free telephone service. The decision made by Justice Marshall says:

"The contract in this case having been made before the legislation occurred prohibiting discriminatory rates, such legislation does not cut any figure in this case. If the contract were valid when made it is within the constitutional protection precluding the legislature from impairing the obligation of contract. Moreover, it is by no means certain but what the special circumstances in this case would in any event, take the same out of the common law rule mentioned.

"It should be noted that the legislature in enacting the law of 1907, appreciating there might be contracts existing between public service corporations and customers, valid in the absence of prohibition by written law, and that it was not within its competency to nullify or impair them, expressly provided that 'The furnishing by any public utility, of any product or service at the rates and upon the terms and conditions provided for in any existing contract executed prior to April 1, 1902, shall not constitute a discrimination within the meaning specified.'"

The order concerning the temporary injunction and the general demurrer, given by the circuit court, was reversed, and that as regards the improper rejoinder of causes of action was affirmed.

Big Submarine Cable Carries Independent Wires at Albany.

The Albany Home Telephone Company has just completed the laying of a large submarine cable across the Hudson river. It contains 150 pairs of No. 19 copper wire and is for the purpose of connecting Rensselaer subscribers direct with the switchboard in the Albany office. The cable was laid under the direction of P. J. Fitzgerald, manager of the Albany Home Telephone Company, who has had much experience in large construction work.

A great deal of public attention was attracted to the company by the news of this work. Lately the company has been somewhat active in advertising. During the recent Hudson-Fulton celebration the office building of the Home company was resplendent at night with a large Independent shield made up of incandescent lights in the Hudson-Fulton colors, yellow, blue and white. The emblem was on the front of the building and excited favorable comment.

Mackay Says There Will Be No Western Union-Postal Merger.

Clarence H. Mackay, head of the Mackay Companies, a corporation which controls the Postal Telegraph Company and is the largest stockholder in the American Telegraph & Telephone Company, when asked about the report that the Postal Company had absorbed the Western Union, says:

"Neither the Postal Company nor the Mackay Companies have entered into any arrangement for the purchase or lease of the Western Union or the purchase of its stock, and neither the Postal Company nor the Mackay Companies contemplate doing so. Competition will continue."

Michigan Tax Commission Puzzled by Varying Cost Data.

Much difficulty is being encountered by the Michigan Tax Commission in determining the valuation to be placed on telephone equipment in appraising the plants in this state for the purpose of taxing them under the ad valorem taxation law.

Owing to the different conditions met with in different cities the companies are reporting a wide range of cost prices for parts of their telephone equipment. In an effort to ascertain a fair average cost for equipment, Commissioner Hoyt, Secretary Lord and Expert Parker have visited Chicago to consult manufacturers and dealers relative to first cost of the apparatus.

Montana and Utah Independent Toll Connection Under Way.

The progress of the work of constructing the extension of the Montana Independent Telephone Company's extension from Butte to Salt Lake City by way of Dillon, Montana, has been engaging the attention of telephone users between these points the past two months. Excellent progress is being made, and last week John C. Norvell, of the Butte company, announced that in addition to the Butte-Salt Lake extension the company has decided to build a line from Whitehall to Dillon, Montana, and from Twin Bridges to Virginia City. Construction operations are to be started within the next few days and both extensions are to be in operating order by January 1.

Recent Telephone Patents

By Max W. Zabel

TELEPHONE SYSTEM.

F. C. Unger, St. Louis, Mo., patent 936,495, Oct. 12, 1909.

This invention is designed to do away with the necessity of the subscriber ringing the central office by a hand generator on local battery systems. The central office is equipped with a ringing machine, generating either alternating or pulsating current and having a ground on one of the terminals. The subscribers' telephones are also grounded. A circuit with the grounded ringing machine at the central office is established when the receiver is taken from the hook. A current flows through winding of subscriber's line drop, thus actuating the drop and notifying the operator that the subscriber desires a connection. The act of the operator plugging in automatically cuts the line drop out of circuit. When the subscriber hangs up his receiver, an extension of the upper end of the switchboard engages a contact which throws a temporary ground on the sleeve side of the line actuating a clearing-out drop in the central exchange.

RECEIVER SUPPORT.

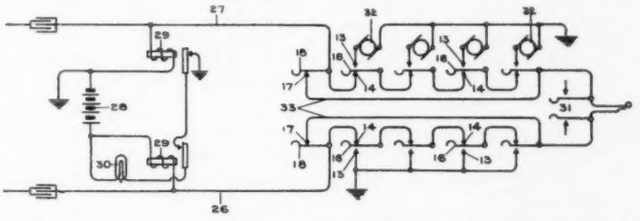
H. Eccles, Laclede, Mo., patent 936,432, Oct. 12, 1909, assigned to S. L. Van Akin, Jr., Syracuse, N. Y.

This patent relates to a support for holding the receiver to the ear automatically instead of by the hand. It consists of a hollow arm attached at the base of the transmitter shell and having on its other end a watch case receiver. The necessary cords for connecting the transmitter and receiver pass through the hollow arm so that there are no exposed conductors.

SELECTIVE RINGING KEY.

C. A. Simpson, Chicago, patent 936,373, Oct. 12, 1909, assigned to Kellogg Switchboard & Supply Co., Chicago.

In this key the contacts of the ringing keys are connected serially in the talking circuit, but a normally closed shunt, adapted to be opened whenever anyone of the ringing keys is operated to call a subscriber, is placed around the contacts. Two closed paths are thus provided for the talking current, one through the normally closed contacts of the ringing keys and the other through the shunt circuit around the keys. Should any of the ringing key contacts become defective, the



talking current may take the path through the shunt circuit and vice versa. Provision is also made for indicating to the operator the key last operated.

TELEPHONE TRUNKING SYSTEM.

C. A. Simpson, Chicago, patent 936,374, Oct. 12, 1909, assigned to Kellogg Switchboard & Supply Co., Chicago.

A trunking circuit adapted to be used for both incoming and outgoing connections at each exchange is described in this patent. In addition to the disconnecting signal, a visual busy signal for each trunk cord is provided, a signal at one end being displayed whenever the trunk is being used by the trunk operator at the other end. By this means a two-way trunk may be used in the same manner as a one-way trunk, and the answering operator is not compelled to test for an idle trunk, as the trunk is designated to her in the same manner as is customary where one-way trunks only are used.

MAGNETIC REGULATOR FOR AUDIPHONE-RECEIVER.

E. E. Williams, Natick, Mass., patent 936,503, Oct. 12, 1909.

This patent relates to a magnetic regulator for an audiphone-receiver. It provides means for controlling the amount of effective flux passing through the diaphragm and cores of the electro magnet when energized by a given current.

In the Manufacturing Field

A New Dial Decade Test Set with Suspension Galvanometer.

A set of the dial decade type with several unique features for facilitating quick and accurate measurements is now being put on the market under the name of the L. & N. Dial Decade Set. It combines lightness, compactness, and a full range of measurements which include resistance measurements from .01 ohm to 10,000,000 ohms, and fault locations by the Murray & Varley loop tests. This set is designed particularly for the class of measurements which are necessary in maintaining telephone and telegraph lines, and in clearing trouble in them.

The manufacturers of this set, the Leeds & Northrup Company, have had extensive experience in producing this class of apparatus, and believe that the new model has many features which are decided improvements. The preliminary models were submitted to several eminent telephone and telegraph engineers for test, and valuable suggestions made by them were embodied. The improvements are such as bring about great convenience and simplicity of manipulation and calculation, and such robustness of construction as to insure permanent accuracy and reliability in making measurements.

The general form of this set is improved by making the case shallow, only five inches deep, so that it will carry easily, in contrast to those that are almost square. The

battery is fastened by two screws to the rubber plate and controlled by a knife switch. This makes it very easy to lift out the rubber plate intact, with battery, galvanometer, and coils all in plain view and easily accessible. In this connection, it might be said that the galvanometer is completely protected and made dustproof by a strong metal case, so that no dirt can possibly enter when the set is opened. This feature appeals strongly to users.

The dial switches can be rotated continuously and no backward motion is necessary in going from the 9 point to the 0 point. The laminated brushes used in these switches are not bent square at the contacts, but at a slight angle, thus making a brush contact that, instead of wearing a groove in the studs, will tend to simply clean the whole surface. The set is built on the four coil decade plan. There is therefore no crowding of parts and the coils may be easily replaced by the operator if one should be burned out. Metal spools are used throughout, these having a carrying capacity four times that of the usual wooden spool type. They are constructed of manganin wire wound on brass spools, silk insulated and thoroughly baked in shellac.

The galvanometer in this set is of the suspension type. The manufacturers claim that the instrument will actually stand more rough use than an ordinary portable voltmeter on account of the spring suspensions; moreover the galvanometer will deflect for the most minute current that can be put through it, there being no initial friction to overcome. Its sensibility is ample for all ordinary work.

The arrangement of ratio coils is an original feature. These are controlled by a single rotary switch that makes contact on ratio studs as follows: .01, .1, 1, 10, 100, and 1,000. The rheostat reading is then simply multiplied by the value indicated by the dial switch, and one is never in doubt as to whether to multiply by arm "A" or arm "B." This gives a range of from .01 times the rheostat reading to 1,000 times, this being as large as can be accurately used with any set of this type. The contract resistance, which is so minute as to be negligible and will remain so, is in the battery circuit so that even should it be high, it would not affect the galvanometer sensibility.

A marked improvement in this set is the absence of all flexible cords. All connections for the loop tests, for

The New L. & N. Dial Decade Set.

outside battery and for outside galvanometer are made simply by throwing knife switches located on the rubber plate of the instrument.

THE FRENCH BATTERY AND CARBON COMPANY, Madison, Wis., is mailing out a folder under the caption "For Live Wires." An illustration, showing the improved French dry battery in its new label, is given, as are also a number of good reasons why telephone companies should use the battery. An order blank is also enclosed with the folder.

An Improved Line of Pocket Meters.

The telephone men in small exchanges have often occasion for use of a pocket voltmeter or ammeter. This is especially true when endeavoring to locate trouble on the rural lines where dry batteries are used. With a pocket meter, the telephone man can easily ascertain the condition of the batteries and replace them if necessary.

So widespread has the use of batteries become, especi-

The New Hoyt Pocket Meter.

ally in telephone service, that the demand for small pocket meters with which to test them has grown to considerable proportions.

The Hoyt Electrical Instrument Works, of Penacook, N. H., early recognized the importance of this field, and have devoted a great deal of attention to it. The latest product of their factory is a line of ammeters and voltmeters approximately the size of a gentleman's No. 16 watch, the novel feature of which is a silver plated metal scale which combines accuracy, durability and tastiness in design.

Realizing that the first requisite was a careful standardization of every part, they have for some time been working along these lines, and now claim to have designed every part so carefully that exhaustive tests failed to show any material error in any part of the scale.

These meters are of the permanent magnet type, and in designing them the purpose of their use has been constantly kept in mind. The relation of the moving system to the poles of the permanent magnet is such as to insure a practically dead beat movement, with extreme sensitiveness to current changes. Every detail has been carefully looked after, even to the construction of the case which is substantially made in one piece to insure rigidity and mechanical accuracy.

A novel design of lettering has been adopted for the dial, and it is the purpose of the makers to carry out the same idea in all instruments of this type, to readily distinguish them from other meters of somewhat similar, general appearance.

Letters received so far by the makers, comment very favorably on the new instruments, indicating that they are meeting with a favorable reception.

THE ELECTRICAL CONSTRUCTION SUPPLY COMPANY, Springfield, Ohio, has ready for distribution some interesting literature and price-lists devoted to malleable iron brackets, pins and break arms for electric-light and telephone companies, and automatic suspension pulleys. This company is the owner and manufacturer of these devices, made under the Chubbuck patents.

THE NEW YORK INSULATED WIRE COMPANY, New York, N Y., is distributing two advertising blotters containing descriptions of its wire and tape.

THE SCIPLE SECTIONAL POLE COMPANY, Minneapolis Minn., has recently published a booklet describing and illustrating its various types of sectional steel poles.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

PERSONAL.

MR. J. WAGNER, formerly of the sales department of the Cracraft-Leich Electric Company, Genoa, Ill., has resigned his position and gone to Texas for his health.

MR. J. F. SHUMAKER, formerly manager of the Coffey Telephone Company, of Waverly, Kansas, has accepted a position with the Livingston Home Telephone Company of Livingston, Montana.

MR. W. H. WILSON, general superintendent of the American Union Telephone Company, with headquarters at Harrisburg, Pa., is making a visit to the Lawrence and Mercer county exchanges of the company.

OBITUARY.

Ohio telephone men have been shocked to hear of the death of Frank Hanna, general superintendent of the Dayton, Ohio, Home Telephone Company, which occurred October 10. Mr. Hanna was 37 years of age. After graduating from college he took service with the Kinloch Telephone Company, leaving them to enter the employ of the Cuyahoga Telephone Company of Cleveland. Since 1902 he had been connected with the Dayton Home company in the capacity of superintendent. In addition to being well known in telephone circles, he was Exalted Ruler of the Dayton lodge of Elks. Mr. Hanna was very popular among his associates, and his untimely death brings a great loss to the company.

NEW COMPANIES.

ROMEO, COLO.—The Romeo Telephone Company was granted a charter, capital stock placed at $500. George H. Berry, E. M. Crow and W. H. Vassar are the incorporators.

ASHLEY, ILL.—The Ashley Telephone & Telegraph Company has been incorporated, with a capital stock of $5,000, to operate telephone and telegraph lines in Ashley and vicinity. The incorporators are A. A. Walker, C. H. Walker, M. Key and Charles W. Lafferty.

HAMMOND, IND.—The Western Indiana Construction Company, with a capital of $100,000, filed articles of incorporation with the Secretary of State very recently. The company proposes to build railroad bridges, viaducts, tunnels, dikes, culverts, telephone and telegraph lines, power plants and other kinds of construction work. Allen T. Russell, Frank M. Zimmerman, Charles T. Knowlton, Robert H. Williams, Thomas W. Potts, Andrew J. Behmeyer and J. Edward Morris are the incorporators of the company.

CONFLUENCE, KY.—The Confluence Home Telephone Company is the name of a new company being organized by Albert S. Sizemore and others, who will construct a local Independent line from Confluence, via Cutshin, to Hyden, where long distance connection will be made. The capitalization of the company, it is reported, will be placed at $2,000.

WARREN, ME.—The Warren Telephone Company is the name of a new company organized for the purpose of conducting and maintaining telephone lines, with a capital stock of $5,000. A. A. Webb, of Warren, is president; G. D. Gould, of Warren, treasurer.

HELENA, MONT.—M. N. Stevens of Harlowton, Lewis Penwell of Helena, and others have filed articles of incorporation of the Meagher-Fergus Telephone Company. The company has a capital stock of $40,000, and Harlowton is to be the headquarters of the company.

TRENTON, N. J.—Articles of incorporation were filed under the laws of New Jersey for the Continental Telegraph & Telephone Company, with an authorized capitalization of $50,000,000. The purpose of the corporation is the amalgamation of as many telegraph and telephone lines as possible. The stock consists of 500,000 shares of a par value of $100 each, 250,000 shares being common stock and 250,000 shares preferred. The amount of capital stock on which business will be commenced is given as $1,000. The incorporators of the company are William M. Clark, of 507 Woodland avenue, Plainfield, N. J.; Powell Crichton, of 52 William street, and William E. Conley, of the same address. Counsel for the company are Philbin, Beekman & Menken.

SNOW HILL, N. C.—East Carolina Electric & Realty Company, incorporated with $25,000 capital stock by W. H. Wells, E. L. Lynch, both of Snow Hill, and S. L. Lynch, Kinston, N. C., will construct telegraph and telephone lines.

HOLLIS, OKLA.—The Harmon Telephone Company was organized here for the purpose of constructing adequate telephone facilities throughout Harmon county, which has only recently been created out of a part of Greer county. The company is capitalized at $3,500. The company expects to erect lines also in Greer, Beckham and Jackson counties. The directors of the company are S. C. Husted, Hollis; A. L. Earnest and Earl Husted of Harmon City; E. R. Mohart, A. L. Earnest and J. L. Butts of Gould.

BUTLER, PA.—A new company, known as the Fenelton Telephone Company, has been organized. The headquarters of the company are located in Fenelton, and the company will construct its first lines to Chicora, via Ratigan and Carbon Center. The officers are: President, F. P. McBride, Fenelton. vice-president, S. I. Pontius, Chicora; secretary, W. I. Sipe, Fenelton; treasurer, P. S. Fennel, Fenelton.

SELMS GROVE, PA.—A new rural telephone company has just been formed a short distance from here, called the Penn Township Telephone Company, with Robert D. Conman as president; Hon. Charles Miller, secretary, and George N. Erdley, treasurer. The company is already giving good service, and its prospects for future growth are very bright. Connection is obtained through the Selms Grove exchange of the American Union Telephone Company.

WEST MIDDLETON, PA.—At an enthusiastic meeting of business men held recently the West Middleton Farmers' Telephone Company was launched. W. M. Melloy is president; E. R. McGaughey, vice-president, and L. N. Smith, secretary.

AUSTIN, TEX.—Articles of incorporation have been filed by the Crosbyton Telephone Company, with a capital stock of $10,000. The incorporators are Julian M. Bassett, J. C. Johnson, Taylor Gault and others.

CHARLESTON, W. VA.—A charter was issued to the Mineral County Mutual Telephone Company of Keyser, W. Va., to build and operate a telephone system. The capital stock is $5,000, and the incorporators are O. A. Hood, T. W. Wagoner, Jos. C. Arnold, H. S. Thompson, J. O. Lyon and others, all of Keyser.

FRANCHISES.

SANTA ROSA, CAL.—Mr. H. C. Eastman has applied for a franchise to construct a telephone line along certain public roads in this vicinity.

CULVER, IND.—The Home Telephone Company of South Bend, Ind., has been granted a franchise by the city board of Culver to construct and operate a telephone system in this place. Culver is the only place of importance between South Bend and Indianapolis in which the Independents have no system. Material will be ordered immediately and placed on the grounds and the system will be ready for operation by the 1st of April at least. George Thorward, assistant manager and engineer of the Home company, interviewed many of the business interests and the sentiment being favorable to the Independent concern, the franchise was procured. The Home Telephone Company of Logansport, which is closely allied with this company, is assisting in the movement.

GARNETT, KAN.—The Independent Telephone Company, under the leadership of S. C. Bybee, has been granted a franchise to construct and maintain a telephone system in this place.

COLLY, KY.—James P. Hartt and others of this city are securing franchises over the county for the building of a telephone line. They are preparing for the construction of a line from Owen Fork, via Flat Gap, Fox Gap, Pound and Lipps, Va., to Norton, Va.

INEZ, KY.—The Martin County Home Telephone Company has secured franchises for the construction of a local and long distance line through Martin county, via Inez, and construction of the lines will be commenced immediately. M. S. Kirk, Inez, is manager of the company.

CONCORD, N. C.—After several months of fighting for the permission to construct and maintain a telephone system in Salisbury, the franchise was granted by the board of aldermen at a meeting held a short time ago. Mr. L. D. Coltrane, with an attorney, attended the meeting and put up strong claims for the Independent company in favor of the granting of the franchise. This franchise had been strongly fought by the opposition company.

CONSTRUCTION.

CORONA, CAL.—Plans are under way for the construction of a local telephone system in this place. J. B. Cooch is at the head of the project.

PETALUMA, CAL.—The Lakeville Telephone Company has awarded a contract to W. D. Thomas to build a new telephone line in the Lakeville district.

SANTA MONICA, CAL.—At a cost of $25,000 the Sunset Telephone Company is preparing to put its wires in a large portion of the city underground.

STOCKTON, CAL.—The Santa Fe Railroad will at once equip all of its cabooses used in connection with freight trains with telephone instruments for the purpose of giving better protection from accidents. A portion of each caboose will be cut off and the necessary plant for making connections with any of the offices along the line of the system will be installed. When a freight is left on a siding some distance from a telegraph office or there is an accident on the main line that should be reported immediately, the trainmen make the connection with the telegraph wires beside the track by means of an extension pole that is carried in the caboose and arranged in joints.

PLAINS, KAN.—The Haskell County Telephone Company will build a line extending to both Garden City and Plains.

DEMOCRAT, KY.—The Upper Rockhouse & Beaver Creek Telephone Company announces that it will soon begin the construction of a local Independent line from Democrat, via Indiana Creek, to Millstone, where a connection will be made with the Letcher County Home Telephone Company's lines. Dr. T. A. Cook, Democrat, is manager of the company.

SOUTH ST. JOSEPH, MO.—The Home Telephone Company has purchased a lot on Illinois street, east of Pryor avenue, and is preparing to erect a modern office building.

PORTSMOUTH, N. H.—New Hampshire is preparing to use the telephone in fighting forest fires. The State Forestry Commission intends to equip one or two mountains this fall with telephone lines for the purpose of protection. This method of checking the spread of forest fires has already been adopted in Maine, where lookout stations equipped with telescopes and telephones have been established at the highest points of eight northern counties. It has been found that this is the most effective way of fighting fires in the forests. New Hampshire's system will be modeled after that now used in Maine. A telephone line will be run to each of the lookout stations, connecting with the nearest exchange.

MONROE, N. C.—The Monroe Telephone Company has made arrangements to change from the common wire to the full metallic system, which will make necessary the rebuilding of the entire plant, at a cost of more than $10,000. Work on the new system will be commenced at once.

MERCER, PA.—The American Union Telephone Company has announced its intention of immediately beginning work on the rebuilding of the exchange in this place, equipping it throughout with the latest type of instruments. It is reported that it is no doubt the beginning of the rebuilding of the entire system in Mercer county, including the large exchanges at Mercer, Sharon, Greenville, Sharpsville and Grove City.

NEW WILMINGTON, PA.—The management of the New Wilmington Independent Telephone Company is making plans for rebuilding the older portion of the plant by substituting copper wire for the iron, and using small sized cable.

YORKVILLE, S. C.—Mr. R. B. Babinton, general manager of the Piedmont Telephone Company, with a good force of linemen, is putting up the cables for the wires throughout the various streets of the town.

MITCHELL, S. D.—The annual meeting of the Dakota Central Telephone Company was held at Aberdeen a few days ago, and its officers made a very satisfactory report of the past year's achievements. The officers were authorized to expend $300,000 for the coming year in making improvements and enlarging the service. The stockholders showed their faith in the enterprise by at once subscribing for an issue of $250,000 in new stock. Much new copper wire will be stretched the coming year and several exchanges on the company's lines enlarged.

SALT LAKE CITY, UTAH.—The Utah & Nevada Telephone Company is extending its lines into Skull Valley from this city, a distance of 75 miles, and it is expected that communication will be had with this country by the end of November. The people of this somewhat remote territory are gratified at the prospect of telephonic communication, as it often happened in the past that if quick communication with Salt Lake had been available, suffering and sometimes lives would have been saved.

WHEELING, W. VA.—News comes from Sisterville that the construction of a long distance line was started from Parkersburg to Charleston. This line will give connection with Charleston, Parkersburg, Sisterville, Wheeling and all other large cities ni the district. The line is to be constructed by the West Virginia Western Telephone Company. The lines will run along through Athens and Pomeroy, Ohio, and connect all small towns along the line. The approximate cost will be in the neighborhood of $38,000.

CRANBROOK, B. C., CAN.—The Kootenay Telephone Company, Ltd., is extending its system to the east and south to connect with the Alberta government system. It is expected the connections will be made before the end of the year.

CRESTON, B. C., CAN.—The Creston Electric Light & Telephone Company is putting the finishing touches to the telephone exchange here. When this is completed the company will build several long distance lines.

PRINCE RUPERT, B. C., CAN.—The Grand Trunk Pacific Railroad Company is installing a fully modern telephone system here. A. B. Smith, manager of telegraphs, Winnipeg, Man., is interested in the project.

WINNIPEG, MAN., CAN.—The Manitoba Government Telephone Commission reports having received a large number of applications for rural telephones during the past two weeks. Owing to the lateness of the season the majority of them will have to be left over until next year. Local exchanges have been opened this month at Gimli, Tuelon, Medora and Strathclair.

MONTREAL, QUE., CAN.—The city has been granted permission by the Provincial government to borrow $24,100,000 by the sale of debentures. A portion of this amount will be used on conduit work for electric wires.

ELECTIONS.

RENSSELAER, IND.—At the annual meeting of the directors of the Home Telephone Company the following officers were elected: President, R. T. Yeoman; vice-president, F. K. Wilsh; treasurer, M. I. Adams, and secretary, E. F. Babcock. The directors made plans to improve the system extensively.

NEW LONDON, IA.—The stockholders of the Henry County Telephone Company held their annual meeting a short time ago and elected the following directors: W. R. Buchanan, J. T. Laughlin, W. J. Francy, C. P. Johnson, H. G. King, Willis Sater and J. E. Peterson.

WILTON, IA.—At the annual meeting of the stockholders of the Wilton Telephone Company, the following directors were chosen: C. H. Wilson, N. E. Nicolaus, A. C. Shiflet, A. R. Leith, Fred Maurer, George Bannick, P. Wacker, D. E. Smith and W. D. Harris. The directors then met and elected as officers, C. H. Wilson, president; Fred Maurer, vice-president; W. D. Harris, treasurer, and H. E. Nicolaus, secretary.

NORTON, KAN.—At the election of officers for the Farmers' and Merchants Telephone Company, ex-Senator E. V. Peters was elected president and Samuel Teaford, vice-president, and Mrs. William Thields, secretary.

GIRARD, KAN.—The following directors and officers were elected to serve the interests of the Mutual Telephone Company for the ensuing year: D. K. Gise, president; G. H. Barker, vice-president; L. B. Davidson, secretary; O. W. Schaeffer, treasurer; D. K. Gise, E. Beadle, G. H. Barker, A. M. Smith, L. B. Davidson, J. A. Wayland and A. Burns. The secretary's report showed a good increase for the past year, and the future outlook of the company is very good.

BURLINGTON, MO.—At the annual meeting of the Mutual Telephone Company last Saturday, J. A. Barr, G. M. Jones, J. H. Sewell were elected directors. The company is in good shape financially, having over $700 in cash on hand.

ST. JOSEPH, MO.—Theodore Gary, of Macon, was elected president and general manager; W. A. Warren, of Joplin, secretary and treasurer; R. E. Frey, of Carthage, and Breckenridge Jones, of St. Louis, directors, of the Home Telephone Company. This company has been doing a great deal of work on its plants throughout the country in the past and Mr. Gary states that it will continue to do so as the business justifies the expense.

JANESVILLE, WIS.—At the meeting of the directors of the Rock County Telephone Company the election of officers of the company took place and resulted as follows: President, F. B. Farnsworth; vice-president, J. L. Bostwick; secretary, Richard Valentine, and treasurer, Hiram Murdock. The directors are F. B. Farnsworth, R. Valentine, J. L. Bostwick, H. Murdock and Isaac Connors.

MISCELLANEOUS.

PERRY, OHIO.—Fire destroyed the telephone exchange and several other buildings a short time ago. Destruction of the entire town was saved by the two telephone operators sticking to their posts, calling other towns for help and notifying sleeping residents of the danger.

BUTLER, PA.—The People's Telephone Company, Independent, and the Butler county management of the Bell Telephone Company are conducting a lively canvass for subscribers and new rights of way in the western part of the country around Prospect and Portersville. The Portersville lines have been operating in connection with the Bell, but there appears to be dissatisfaction, as the Independent system is making a start in the territory there.

NEW CASTLE, PA.—The work of organizing the new National Telephone Companies, which were reported as intending to take in a number of telephone plants in Pennsylvania and Ohio in connection with the Petroleum Telephone Company of Oil City, Pa., the Home Telephone Company of Youngstown, Ohio, and several other Independent plants, does not seem to be progressing very fast. It cannot be learned just what route the new company will adopt to connect the Youngstown, Ohio, plant with the Oil City plant. There is a direct route by way of New Bedford and Harrisville, Pa., just recently completed by a number of Independent companies, but it cannot be learned that any of them have been invited to join the new company.

SPRING GROVE, WIS.—The name of the Spring Grove Telephone Company has been changed to the McHenry County Telephone Company, and the capital stock has been increaesd to $20,000.

LEXINGTON, VA.—A deal of considerable importance in that vicinity was consummated recently, when the Lexington Mutual Telephone Company, with exchanges in Lexington and Buena Vista, until recently owned by N. C. Watts, of Staunton, and T. S. Burell, of Lexington, was acquired by R. B. Moses, of the latter place, by whom it will be operated under the same name.